

# MONTHLY WEATHER REVIEW.

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## INTRODUCTION.

The REVIEW for October, 1894, is based on reports from 3,340 stations occupied by regular and voluntary observers. These reports are classified as follows: 150 reports from Weather Bureau stations; 39 reports from U. S. Army post surgeons; 2,199 monthly reports from State Weather Service and voluntary observers; 32 reports from Canadian stations; 221 reports through the Southern Pacific Railway Company; 536 marine reports through the co-operation of the Hydrographic Office, Navy Department, and "New York Herald Weather Service;" monthly reports from 32 U. S.

Life-Saving stations; 60 reports from navigators on the Great Lakes; monthly reports from local services established in all States and Territories; and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

The WEATHER REVIEW for this month has been prepared under the general editorial supervision of Prof. Cleveland Abbe. Unless otherwise specifically noted, the text is written by the editor, but the statistical tables are furnished by the Division of Records and Meteorological Data, in charge of Mr. A. J. Henry, acting chief of that division.

## CHARACTERISTICS OF THE WEATHER FOR OCTOBER, 1894.

The most prominent features of the month of October were the hurricane that passed over the south Atlantic States on the 8th and 9th, and those that passed parallel to the Atlantic coast some distance to the eastward on the 16th and 20th and on the 25-27th. The temperature throughout the United States averaged a little above the normal, and many

stations reported the highest mean temperature on record. The precipitation was generally below the normal in the interior of the country, but above the normal in New England, the Middle States, and on the coast of Washington. The current REVIEW contains the first of a series of new chapters on the humidity of the atmosphere and on the relations between meteorology and terrestrial magnetism.

## ATMOSPHERIC PRESSURE.

[In inches and hundredths.]

The distribution of mean atmospheric pressure reduced to sea level, as shown by mercurial barometers not reduced to standard gravity and as determined from observations taken daily at 8 a. m. and 8 p. m. (seventy-fifth meridian time), during October, 1894, is shown by isobars on Chart II. That portion of the reduction to standard gravity that depends on latitude is shown by the numbers printed on the right-hand border. This Chart also gives the so-called resultant wind directions for this month, based on the data given in Table IX of this REVIEW.

During the current month of October the highest mean pressures have been: 30.08, Augusta; 30.07, Atlanta, Chattanooga, and Memphis; 30.06, Galveston, Palestine, Knoxville, and Montgomery. On the Pacific coast the highest pressures have been: 30.09, Salt Lake City; 30.07, Idaho Falls and Carson City; 30.06, Winnemucca.

The lowest mean pressures were: 29.83, Duluth and Port Arthur; 29.85, Moorhead; 29.86, St. Vincent and Marquette; 29.87, Williston; to the northward of this region the lowest pressures at Canadian stations were: 29.82, at Calgary and Battleford; the low area of the Gulf of California is shown by the means 29.86, Yuma; 29.93, Tucson; 29.95, San Diego.

The normal distribution of atmospheric pressure and normal resultant wind direction for the month of October were approximately shown on Chart V of the REVIEW for October, 1893, as computed by Prof. H. A. Hazen, and are not now reproduced. As compared with the normal for October, the mean pressure for the current month was deficient at all stations, except Halifax and Sydney. The region of greatest deficit was in the upper Mississippi and lower Missouri valleys and the Lake region, where the average deficit was about 0.14; the maximum deficits were 0.17 at Duluth and Port Arthur, and 0.15 at Green Bay, Davenport, Moorhead, and Winnipeg, Manitoba. On the Pacific coast pressures were generally deficient; but a region of slight excess, 0.01, extends from San Francisco to Santa Fe.

As compared with the preceding month of September, the pressures reduced to sea level show a rise throughout the eastern slope, Rocky Mountain and Pacific coast stations, the maximum being: 0.11, Idaho Falls and Fresno; 0.10, Salt Lake City and Sacramento; 0.09, Winnemucca and Carson City. From the Mississippi eastward to the entire Atlantic coast the mean pressure had fallen, the largest falls being: 0.15, Yarmouth; 0.14, Father Point, Halifax, Eastport, Northfield, and Rochester; and 0.18, Rockcliffe.

## DIURNAL VARIATIONS.

The systematic periodic diurnal variations of pressure are shown by the hourly means given in Table VI.

## AREAS OF HIGH AND LOW PRESSURE.

The following sections give some details as to the phenomena attending the individual areas of high and low pressure. The storm warnings officially issued by the Weather Bureau either through the general forecast official at Washington, or by the respective local forecast officials, are enumerated in connection with the respective areas of disturbance.

## MOVEMENTS OF CENTERS.

The following table shows the date and location of the center at the beginning and ending of each area of high or low pressure that has appeared on the U. S. Weather Maps during the month, together with the average daily and hourly velocities. The monthly averages will differ according as we consider each path as a distinct unit, or give equal weight to each day of observation; in the first case the monthly average is taken by paths, in the latter case by days.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long. W.	Length.	Duration.	Daily.	Hourly.
<b>High areas.</b>										
I.	1, a. m.	40	86	2, a. m.	33	77	700	1.0	700	28.3
II.	1, a. m.	37	120	8, a. m.	44	77	3,700	7.0	529	22.0
III.	5, p. m.	45	125	9, a. m.	31	98	2,300	2.5	657	27.4
IV.	5, a. m.	46	126	13, p. m.	39	73	3,400	4.5	756	31.5
V.	11, p. m.	48	126	16, a. m.	36	81	3,000	4.5	667	27.8
VI.	14, p. m.	43	116	19, a. m.	37	73	3,350	3.5	957	39.9
VII.	16, a. m.	50	125	17, a. m.	51	103	800	1.0	800	33.3
VIII.	20, p. m.	51	69	25, a. m.	44	86	1,350	4.5	300	16.7
IX.	21, p. m.	44	112	24, p. m.	48	86	1,650	3.0	550	18.3
X.	24, a. m.	37	125	27, a. m.	33	95	2,300	3.0	767	32.0
XI.	26, p. m.	41	120	31, a. m.	34	105	2,600	4.5	578	24.1
XII.	27, p. m.	45	81	30, p. m.	47	58	1,700	3.0	597	23.6
Sums.							26,850	43.0	7,828	
Mean of 13 paths.									632	27.2
Mean of 43 days.									624	26.0
<b>Low areas.</b>										
I.	1, a. m.	46	106	7, a. m.	50	55	2,500	6.0	417	17.4
II.	1, a. m.	41	66	2, p. m.	47	52	850	1.5	567	23.6
III.										
IV.	2, a. m.	14	78	11, a. m.	51	66	3,400	9.0	378	15.8
V.	5, a. m.	31	115	10, a. m.	48	53	3,500	5.0	700	29.2
VI.	5, p. m.	37	125	6, p. m.	39	122	150	1.0	150	6.3
VII.	7, p. m.	52	120	10, a. m.	47	85	1,600	2.5	667	27.8
VIII.	10, a. m.	55	111	12, a. m.	54	90	900	2.0	450	18.8
IX.	11, a. m.	40	98	15, p. m.	65	130	1,900	4.5	422	17.6
X.										
XI.	12, p. m.	54	117	18, p. m.	50	55	3,200	6.0	533	22.2
XII.	16, a. m.	12	64	22, a. m.	45	33	3,600	12.0	300	12.5
XIIIa.	10, a. m.	30	125	21, a. m.	48	93				
XIIIb.	18, a. m.	39	102	21, a. m.	48	93				
XIIIc.	18, p. m.	49	124	21, a. m.	48	93				
XIV.	22, a. m.	23	67	31, a. m.	53	27	4,000	9.0	444	18.5
XV.	20, a. m.	41	125	22, a. m.	51	110	800	2.0	400	16.7
XVI.	22, p. m.	43	126	29, p. m.	40	68	4,100	7.0	586	24.4
XVII.	25, p. m.	55	115	31, p. m.	46	74	3,000	6.0	500	20.8
XVIII.	29, a. m.	54	120	31, p. m.	53	101	800	2.5	320	13.3
XIX.	31, p. m.	55	49							
Sums.							34,320	76.0	6,834	
Mean of 15 paths.									456	19.0
Mean of 76 days.									451	18.8

## HIGH AREAS.

I.—This appeared on the 1st, a. m., in central Indiana, and was a continuation of high No. XIV of the September REVIEW. It moved southeast and disappeared on the 2d off the south Atlantic coast.

In connection with this area, frost warnings were issued as follows: 1st, 8 a. m., eastern portion of Ohio.

II.—On the 1st, a. m., pressure was rising off the coast of California, and the central high pressure, after pushing eastward, was, on the 4th, a. m., central in Utah, while low No. I had moved southeast to Lake Superior. After this date the

high pressure extended south and east and on the 6th turned northeastward to the middle Atlantic coast, disappearing on the 8th off Nova Scotia.

In connection with this area, frost warnings were issued for western New York on the 6th, a. m.

III.—On the 5th pressure rose off the coast of Oregon and British Columbia, and by the 7th, a. m., it was highest over Idaho and Montana. It then stretched southeastward into Texas, where it disappeared on the 9th, while the high area following it was advancing over a similar course.

In connection with this area, the following cold-wave signals were ordered: 6th, p. m., Huron and Moorhead; 7th, a. m., Yankton, Omaha, Concordia, Wichita, Topeka, St. Paul, Minneapolis, Des Moines, Dubuque, Davenport, Keokuk, Sioux City, and La Crosse.

IV.—This began, like its predecessor, over Oregon and Washington on the 8th and was, on the 10th, a. m., central in Idaho. At this time Nos. III and IV constituted a ridge extending from the Gulf States northwestward beyond our stations. By the 11th, a. m., No. IV was central in the Gulf States, after which it turned northeastward and disappeared on the 12th, a. m., off Cape Hatteras.

In connection with this area, frost warnings were issued for the District of Columbia, Maryland, and Virginia on the 10th, a. m.

V.—On the 11th, while a ridge of high pressure extended over the south Atlantic and Gulf States, pressure again began to rise in Oregon, and by the 12th, a. m., high area No. V was central in Idaho and western Montana. At this time high No. IV was central in Virginia, and a very slight trough between these two high areas extended from Texas to Lake Superior. This trough developed into low area No. IX, and apparently furnishes an example of the origin of a cyclone between two anticyclones. By the 14th, a. m., high No. V extended as a long oval from Lake Superior to Louisiana, and by the 16th, a. m., it was central in the south Atlantic States, where it then disappeared in the presence of the advance of another area, No. VI, which was then central in Colorado. Together these constituted a ridge of high pressure extending from the Atlantic coast and Bermuda westward over the Gulf States and northwestward to Oregon, where high area No. VII was at that time approaching. This ridge undoubtedly represents the tropical belt of high pressure, which on an ideal globe of uniform surface would extend east and west along the parallel of 30°, but in the present case pursued that parallel from the mid-Atlantic to Texas only, and trended northwestward to Alaska. The diversity of the continental and oceanic surfaces and the extended areas of storm and rain so completely break up the ideal circulation into large oceanic and continental areas that the latter offer problems of the highest importance to the students of the mechanics of the atmosphere.

In connection with this area, the following frost warnings were issued: 14th, 8 a. m., for the interior of the Atlantic coast districts; 14th, 8 p. m., for the interior of North Carolina, the northern portion of South Carolina, and the interior of Georgia.

VI.—On the 14th a slight rise occurred on the Rocky Mountain plateau region, which, on the 8 p. m. map, is considered as central in southern Idaho, while low pressure No. X was in Arizona and No. XI in Alberta. This high pressure area was essentially a portion of the belt of high pressure that continued prominent during the first half of the month in the region between Oregon and the south Atlantic coast. It moved slowly southeastward and was barely recognizable as a special high pressure on the 17th in the Gulf States, but afterwards again became prominent as it moved northeastward, and finally disappeared on the 20th off the middle Atlantic coast.



VII.—On the 16th, a. m., pressure was high in British Columbia, as previously stated. This area moved eastward across the mountains, and on the 17th, a. m., was central in Saskatchewan, after which it merged into No. VI.

VIII.—On the 20th, p. m., pressure rose in the St. Lawrence Valley and the region to the northward, indicating a flow of air toward low pressure No. XIII, which was then central in the eastern portion of North Dakota. The highest pressure remained in Labrador north of our stations until the 24th, p. m., and disappeared on the 25th off the coast of Nova Scotia and Newfoundland, having materially contributed to the growth of low No. XIII and to the hurricane (low No. XIV) as it moved from the West Indies northward toward New England.

IX.—On the 21st, p. m., an extensive area of high pressure, which apparently had advanced southeastward over California and Nevada, became central in Idaho. By the 23d, a. m., it was central in Nebraska, while the extensive low pressure No. XVI was advancing into Washington and the hurricane (low No. XIV) was central in the Bahamas. The central portion of the country was now occupied by a high area that extended from the Gulf of California and the Gulf States northward to Hudson Bay. By the 24th, a. m., the region of highest pressure had receded northward to Lake Superior, and after this disappeared from the map, while area No. VIII represented the eastward movement of the high pressure through the Dominion of Canada.

X.—On the 24th, a. m., pressure was rising on the coast of California and Oregon, and on the 25th, a. m., the highest pressure was central in Idaho. After this northeastward movement the center turned to the southeast and disappeared on the 27th, a. m., in the west Gulf States.

In connection with this high area, the following cold-wave signals were ordered: 25th, a. m., Rapid City, Pierre, Huron, Yankton, Denver, Pueblo, Valentine, North Platte, Omaha, Concordia, Wichita, Dodge City, and Kansas City.

XI.—On the 26th, p. m., pressure was rising on the coast of Oregon while low No. XVII was moving southeastward from Stikine to Dakota. On the 28th the center had moved southeastward into northern Nevada, after which the area of high pressure expanded, covering the whole of the Rocky Mountain plateau region on the 29th without much change in the location of the central maximum pressure. During the 30th the ridge of high pressure gradually diminished, and by the 31st, a. m., had disappeared from the Rocky Mountain region, but leaving an area of high pressure in the Gulf of Mexico.

In connection with this high area, cold-wave signals were ordered as follows: 27th, a. m., Rapid City, Cheyenne, Denver, Pueblo; 28th, a. m., Omaha, Concordia, Wichita, Topeka, Moorhead, St. Paul, Duluth, Minneapolis, Des Moines, Dubuque, Davenport, Keokuk, Sioux City, Springfield, Ill., Columbia, Kansas City, and La Crosse.

In connection with this high area, the following frost warnings were issued: 30th, 8 a. m., for the western portion of North Carolina and South Carolina, the northern portion of Georgia, the interior of western Florida, Alabama, Mississippi, Louisiana, Arkansas, and Tennessee.

XII.—On the 27th, p. m., an area of moderate high pressure had descended southward over the Lake region, coming in between the hurricanes low No. XVI, which was then off Cape Hatteras, and the low pressure No. XVII, which was then central in South Dakota. This area of high pressure moved eastward and disappeared on the 29th in New England, but reappeared and finally disappeared on the 30th south of Newfoundland. Its existence and movement were intimately associated with the movement of the hurricane center.

#### LOW AREAS.

I.—On the 1st, a. m., this low area was central in Mon-

tana, being a continuation of low No. XV of the series for September. After advancing southeast into North Dakota it moved eastward and disappeared over Newfoundland on the 6th; extensive areas of light rain accompanied this low pressure both in the front and rear.

In connection with low area No. I, the following signals were ordered: 1st, 8.22 p. m., storm northeast, at Duluth and Ashland section; southeast at lakes Pepin and Michigan, and information at Houghton and Sault Ste. Marie. 2d, 9 a. m., storm southwest, lakes Pepin, Huron, and Superior, except Duluth and Ashland section. 2d, 10.30 a. m., storm southwest at stations on Lake Erie, except Detroit. 2d, 7 p. m., changed to storm northwest, Lake Pepin, Duluth, and Ashland sections; changed to storm southwest, Houghton, Marquette, Sault Ste. Marie, and Lake Michigan. 3d, 9.45 a. m., storm southwest, Lake Ontario; 7 p. m., storm northwest, lakes Pepin, Superior, and Michigan. 4th, 9.30 a. m., storm southwest continued, Lake Huron; 7 p. m., storm northwest continued, lakes Pepin, Superior, and Michigan; changed to northwest, Lake Huron.

II.—This was a continuation of the low area hurricane No. XII of September. On the 1st it passed northeastward some distance off the coast of New England and Nova Scotia, and its further history belongs to the chapter on North Atlantic Meteorology.

The signals and storm warnings that had been issued during the 30th of September remained until the 1st of October, and no new signals were necessary for stations in the United States.

III.—This number is given to the depression that frequently appears extending northward over the Gulf of California and Arizona. The principal dates of low pressure at Yuma are given on Chart No. I, and are as follows: 2d, p. m., 29.78; 5th, p. m., 29.68; 10th, p. m., 29.74; 14th, p. m., 29.70; 18th, p. m., 29.67; 24th, p. m., 29.90; 26th, p. m., 29.80; 31st, p. m., 29.85. It generally happens that the formation of low areas in this region occurs simultaneously with the appearance of a low area north of Oregon and Washington as though both depressions depended upon the retreat westward of the high pressure off the Pacific coast, or as though both depended upon the advance of a wave of low pressure eastward over the Pacific coast. There is no apparent connection between the dates of these depressions and the phases of the moon, so that the hypothesis of a lunar tidal action does not seem to be well supported. The exact nature of the mechanical origin of these depressions is, therefore, still a matter of uncertainty; the mere statement that the Arizona low pressure is an extension northward of the equatorial belt of low pressure and that the northern low pressure over British Columbia is an extension southward of the low area of the Aleutian Islands does not explain their origin or their mechanical connection with each other. It is very possible that the forces acting upon the atmosphere of the Pacific Ocean are so adjusted to the mass of that atmosphere and the resistances to its motion, that when any movement is once established it must proceed in a rhythmic or nearly rhythmic succession of movements that are interfered with principally by the rain and clouds to which they give rise.

The low pressure above enumerated, namely 29.74 on the 10th, p. m., represents an area (see No. X in the following series) which hovered about this region until the 14th without any well-marked area of high pressure intervening.

IV.—This was a hurricane which first became severe at Weather Bureau stations on the 7th, but by means of a few reports from Central American and West Indian stations the earlier history of this depression may be traced from its beginning on the 1st in the southern portion of the Caribbean Sea off the northern coast of Colombia, South America. On that date an area of high pressure was moving rapidly south-



ward over the United States and Cuba, and pressure was falling in the States of Nicaragua and Panama. By the 2d, a. m., the surrounding winds indicated a whirl central a little east of Roncador reef. This whirl moved northeastward, passing midway between Cuba on the right hand and Nicaragua, Honduras, and Yucatan on the left hand. Shut in by these land areas it apparently did not grow in size, but may have been as intense at the center as it was in the subsequent part of its path.

The general depression within which this area occupied the southern portion was at first a continuation of that which also contained the hurricane designated as No. XII in the September REVIEW, but subsequently this hurricane in the Caribbean Sea entered the region of low pressure whose northern portion was occupied by low No. I of the present month. On the 5th as low No. I passed rapidly eastward over Newfoundland the present hurricane was moving slowly northward through the eastern portion of the Gulf of Mexico, and was fed on its western side by high area No. II which was then central in Kansas and Missouri. As this high area moved rapidly eastward the hurricane entered the general depression containing low No. V which was central on the 7th in Minnesota. During the 8th and 9th the centers of these two low pressures rapidly approached each other; No. V went rapidly eastward toward Newfoundland while No. IV went rapidly northeastward over Florida and Georgia. Meanwhile a third low area (No. VII) had advanced from British Columbia southeastward, and by the 10th, a. m., was central over Lake Superior when No. IV was central off the coast of New Jersey and No. V was central in Newfoundland. These three centers thus formed the vertices of a triangle whose three sides were about twenty degrees in length. From this point onward, the record seems to show that low No. VII rapidly dwindled away while Nos. IV and V passed on to the Atlantic Ocean.

The following reports from Weather Bureau stations show the times of beginning and ending of this storm:

Mobile, Ala., rain began 7th, 8.45 p. m., with high wind, and continued until 8th, 5.45 p. m.

Fort Morgan, Ala., 7th, 8 a. m., 29.85, east to northeast 22 miles, high tide and heavy sea; 4 p. m., rain began; 8 p. m., 29.75, east-northeast 32 miles. 8th, 8 a. m., 29.43, northeast 53 miles, light rain, tide water 5 feet above ordinary high tide, very heavy sea; 10 a. m., 29.35, 60 miles northeast; 11.55 a. m., 29.30, 60 miles; 2 p. m., 29.24, wind 62.4; 3 p. m., 29.34; 6.30 p. m., 29.38, wind 79.2, lightening up in the northwest and clouds moving rapidly from north to south; 8 p. m., 29.46; 10 p. m., 29.54. 9th, 8 a. m., 29.68, wind north 20 miles.

Pensacola, Fla., 8th, rain continued from early morning and ended 8.15 p. m., with heavy northeast gales until late in the afternoon. The tide was higher than ever before.

Lake City, Fla., 8th, a heavy east storm occurred all day, which increased after dark to 40 or 50 miles with heavy rain; the storm increased in intensity until daylight of the 9th, when the wind was about 80 miles an hour with heavy rain.

Jacksonville, Fla., rain began at 10.40 p. m., 8th, with high wind and rapidly falling barometer. The early morning of the 9th the storm increased in violence; a maximum velocity of 62 miles southeast occurred at 5.45 a. m., being the highest velocity ever registered at this office. The rain ended at 9.30 a. m.

Charleston, S. C., 9th, rain continued all day, with high wind with a maximum velocity of 48 miles southeast. All shipping remained in port.

Charlotte, N. C., 9th, rain continued all day, ending at 7 p. m., the total amount being 3.80 inches. High wind prevailed during the day; maximum velocity 30 miles.

New York, N. Y., rain began 9th, 11 p. m., became heavy

the morning of the 10th and ended at 12.45 p. m. It is roughly estimated that at least \$1,000,000 worth of property was saved by the timely warnings.

Block Island, R. I., 10th, a severe storm set in at 12.45 a. m., accompanied by heavy rain, and increased in energy to a maximum velocity of 84 miles; storm ended at 9.25 p. m.

Narragansett Pier, R. I., 10th, rain began during the early morning, with a terrific northeast gale, the storm being the worst in several years.

Woods Holl, Mass., 10th, heavy rain began at 3.30 a. m., and continued until 11 p. m.; a severe gale blew from the northeast from 5 a. m., veering to east and southwest, with a maximum velocity of 60 miles per hour from the southwest. Owing to the timely warning given of the storm but few disasters were reported.

Boston, Mass., 10th, rain began about 3 a. m. and continued until 4.20 p. m., with high wind, reaching a maximum velocity of 49 miles east at 10 a. m. The timely warnings of the Bureau kept many vessels in port.

Portland, Me., 10th, rain began at 8.30 a. m. and continued until 8.12 p. m., with high wind. The storm was one of the severest that has ever occurred at this station.

In connection with this low area the following signals were ordered: 5th, 12.30 p. m., southeast, Key West. 6th, 10.55 p. m., northeast, Port Eads. 7th, 10.30 a. m., northeast, New Orleans to Tampa; 3.30 p. m., northeast, Galveston; 10.10 p. m., northeast, Jacksonville and section to Norfolk; 10.15 p. m., continue northeast, Port Eads; 10.20 p. m., continue information at Key West. 8th, 11 a. m., change to southeast at Tampa; 10.50 p. m., continue signals at Port Eads, Punta Gorda, Jacksonville to Norfolk. 9th, 8 a. m., southeast, Savannah and section; 10.50 a. m., northeast, Baltimore to Nantucket; 11 a. m., information, Portland and Eastport; 2 p. m., northeast, Boston and section; 4.40 p. m., southwest, Wilmington; 4 p. m., northwest, Savannah and section; 10.55 p. m., continue signals Morehead to West Point; information, Portland and Eastport. 10th, 9.50 a. m., northeast, Eastport and Portland; 9.50 a. m., change to northwest, Breakwater to New York; continue signals from New Haven to Woods Holl; 11.30 a. m., northeast signals at Oswego and section and Rochester; 8 p. m., northwest, New London. 11th, 10.30 a. m., information, Lake Ontario, Eastport, and Portland; 8.30 p. m., southwest, New York. For list of special warnings and other information, see Storm Bulletin No. 3 of 1894.

V.—On the 5th, a. m., low area No. V was central in British Columbia, having apparently moved rapidly southeast without much previous warning. By the 6th, p. m., this stretched as a trough from Colorado to Wisconsin, and then rapidly became an oval storm center over Lake Superior, while high area No. III moved southeast and was central in Colorado and Kansas. By the 9th, a. m., the low pressure was central at the mouth of the St. Lawrence, and by the 10th, a. m., it passed over Newfoundland into the Atlantic.

In connection with this area, the following signals were ordered: 6th, 6 p. m., southeast, Duluth and Ashland sections and Lake Pepin. 7th, 11 a. m., southwest, lakes Michigan and Huron, Sault Ste. Marie, and Marquette; northwest, Lake Pepin, Duluth, Houghton, and Ashland section; 10 p. m., southwest, Lake Erie. 8th, 10 a. m., Lake Pepin, Duluth, Houghton, and Ashland section continue; other signals on lakes Michigan, Superior, and Huron changed to northwest.

VI.—On the 4th, p. m., pressure was low over the Gulf of California and at the same time began to fall in British Columbia. The southern area extended northward along the coast of California, while low No. V advanced southeast over British Columbia, and on the 5th, p. m., covered southern California and the adjacent Pacific. By this time the two centers, Nos. V and VI, were inclosed in a general depression covering California and the Rocky Mountain plateau. The



former depression moved steadily eastward, while the latter, separated from it by the southward movement of high No. III, filled up and disappeared in northern California.

VII.—On the 7th, p. m., and immediately in the rear of high No. III, a new depression advanced eastward over British Columbia and reached Manitoba by the 9th, a. m., when the hurricane (low No. IV) was central in Georgia. During the next twenty-four hours this depression rapidly broke up, while the hurricane center rapidly grew in size and intensity and had, by the 10th, p. m., reached that position in New England, toward which low No. VII was apparently moving.

The fact that in this, as in many other instances, the charts show the simultaneous presence of several centers of low pressure moving in different, and sometimes almost opposite, directions, sometimes approaching and sometimes receding from each other, proves that there must be a limit, depending upon the depth of the air and the extent of the whirl, beyond which the motions of these cyclones have little influence upon each other. The intermediate neutral region is usually the so-called area of high pressure, with its comparatively clear sky, light winds, and on the southern side falling, but on the northern side rising, temperatures. Just as the uprushes in a turbulent river afford the supply of water that overflows and descends into the little whirls, with their hollow centers, that dot the surface of the stream, so the high areas in the atmosphere furnish the descending air that feeds the ascending whirls of the low areas. The first tendency of the whirls in both the river and the atmosphere is to move inward toward the source of supply as fast as this becomes exhausted, and if it is continually renewed, their motion may become very slow; the second tendency of the whirl is to move together with the source of supply in the general direction down the stream, or, in the case of the atmosphere, in the temperate zones toward the east and in the torrid zone toward the west.

In connection with low area No. VII, the following signals were ordered: 9th, 5.30 p. m., northwest, lakes Superior and Pepin, except Sault Ste. Marie; 10.45 p. m., information at Buffalo and on Lake Ontario.

VIII and IX.—On the 10th, a. m., pressure began to fall in Alberta on the northern side of high No. IV, and in accordance with previous analogies this depression must already have had considerable motion toward the southeast. Its path was generally north of our stations, and on the 12th, a. m., the low area extended from Wisconsin northward to Hudson Bay. On the 12th, p. m., the extreme southern end of this depression, whose existence can be barely traced during the 11th as an incipient whirl in Kansas, Iowa, and Wisconsin, had become a well-marked storm center on Lake Michigan, whose track is given as low No. IX. While No. VIII broke up and disappeared in British America, the southern area, No. IX, rapidly developed into a well-marked whirl, which moved eastward on the 13th over the St. Lawrence through New England into New Brunswick, where it was central on the 14th, p. m., after which it passed to the Atlantic Ocean and apparently broke up.

In connection with low No. IX, the following signals were ordered: 13th, a. m., southwest, from Cleveland to Oswego, information from Detroit to Sandusky; 9.50 a. m., storm from New Haven to Woods Holl section, information at New York and from Boston and section to Eastport, lakes Erie and Ontario; storm northwest, lakes Huron and Michigan and at Sault Ste. Marie, Marquette, and Houghton section. 14th, 10.20 a. m., continue signals from Portland to Eastport, change Oswego to northwest; 3 p. m., information at Duluth, Lake Pepin, and Ashland. 15th, 10.30 p. m., information on Lake Erie.

X.—This number is given to one of the more interesting of the numerous areas of low pressure that appeared in Arizona.

The low barometer that reached a minimum at Yuma on the 10th, p. m., apparently continued in that region until the 14th, p. m., while areas of high pressure, forming a continuous belt of high pressure, prevailed over the Rocky Mountains to the north and east, and in fact extended, on the average, from the south Atlantic coast west-northwest to California and Oregon. The location of the center is too uncertain to justify plotting its track. After the breaking up of this belt of high pressure, on the 17th the low area in Arizona and the low No. XIII off the coast of Oregon temporarily formed a continuous trough, and low pressure prevailed for several days along the entire Pacific coast, so that on the 18th, p. m., the lowest pressure of the month occurred at Yuma.

XI.—On the 12th, p. m., pressure was falling in British Columbia and Alberta. This depression remained at the northern end of our stations and evidently passed southeastward, until on the 17th, a. m., it was central at the mouth of the St. Lawrence, after which it passed to the Atlantic Ocean as an extensive storm center.

In connection with this area, the following signals were ordered: 16th, 9 a. m., southwest at Marquette, Sault Ste. Marie, and Huron, information on Lake Michigan; 10.45 a. m., southwest storm at Buffalo, Erie, and Cleveland; 10.55 a. m., lakes Huron and Erie; 1.30 p. m., southwest, Ontario; 6 p. m., northwest, Lake Huron, Sault Ste. Marie, Marquette, Green Bay and section, Houghton, and Mackinaw section. 17th, 12 m., northwest, Lake Huron, Sault Ste. Marie, Marquette, Mackinaw section, and Buffalo.

XII.—This was a West Indian hurricane whose history belongs to that of the North Atlantic storms, except only for the fact that on the 12th, and especially on the 16th, when its position and motion were as yet very imperfectly known, it was necessary to mention its existence in the general summary of weather conditions and to exhibit signals at Weather Bureau stations on the Atlantic coast as follows: 16th, 2 p. m., information, from Key West to Cedar Keys; 4 p. m., northeast at Cedar Keys, Tampa, Key West, Punta Gorda, Jupiter; 3.30 p. m., information at Jacksonville and section. 17th, 10.30 a. m., change to information at Cedar Keys, Tampa, Punta Gorda, and Jupiter.

XIII.—During the first half of October the general characteristic of the atmospheric movements was the prevalence of low areas over the Atlantic and of high areas over the United States, but on the 16th the inverse conditions began to prevail; the high areas prevailed to the east and farther to the west, leaving a series of indefinite low areas for several days over the western half of the United States. This series began with the appearance of low No. XIII *a* off the coast of northern California on the 16th, a. m., which depression, after moving inward, disappeared over Idaho on the 18th and 19th; its track is given on Chart I, although confessedly very unsatisfactory. On the 18th, a. m., area XIII *b* appeared in Nebraska as an independent center in the general depression that extended from the upper Mississippi southwest to the Gulf of California and northwest to British Columbia. This depression may be traced as a continuous whirl and slight depression to the 20th, a. m., by which time it, with XIII *c*, formed a continuous trough from Wisconsin to British Columbia, although afterwards they separated as independent depressions. The map of the 18th, p. m., also shows a third independent low area, XIII *c*, in British Columbia, where it had remained without motion and continued vacillating about that region until the 20th. On the latter date pressure was still decidedly below the normal from the Mississippi and Lake region west to the Pacific. Such a condition as this frequently happens on the Atlantic Ocean and over the United States and probably also over the North Pacific. Within the general depression moderate and indefinite depressions appear and disappear until the approach of a high area



gives occasion for the formation of a decided whirl and low barometer in some portion of the general depression. In the present case this event seems to have been the approach of low No. XV from the Pacific on the 20th.

After XIII *a*, *b*, and *c* had united on the 20th the depression lettered XIII *abc* moved northeastward to the north of Lake Superior, bringing heavy weather on that lake.

In connection with this area the following signals were ordered: 20th, 10.30 p. m., storm northeast at Duluth, southeast at Marquette; 21st, 11 a. m., southeast, lakes Michigan, Superior, Ontario, except northwest at Ashland, Houghton, and Duluth; information, Pepin.

XIV.—This was a West Indian hurricane whose details belong in great part to the storms of the North Atlantic Ocean; it was first located on the 22d at about N. 23°, W. 63°, from which position it moved eastward until, on the 25th, a. m., it was at about N. 26°, W. 76°, being then north of the Bahamas; its path now turned to the northeast at a considerable distance from the Atlantic coast until, on the 31st, it was central in N. 53°, W. 27°.

In connection with this hurricane, the following signals were ordered: 21st, 3 p. m., northeast, Norfolk section; 23d, 2.20 p. m., storm northwest, 2.50 p. m., from Key West to Jacksonville and section; information, at 2.50 p. m., from Savannah to Hatteras; 8 p. m., change to northeast at Jupiter; 10.20 a. m., information signals, Lake Pepin, Duluth, and Ashland section. 24th, 2.10 p. m., continue signals from Key West to Charleston, and from Wilmington to Hatteras; 2.40 p. m., information signals at Norfolk and section (except Hatteras) and Newport News; 9.50 p. m., southeast at Narragansett, Woods Holl and section; information at Boston and section. 25th, 10.50 a. m., change to information from Jacksonville to Key West; 1.50 p. m., northeast, Boston and section; 2.40 p. m., northeast at Sandy Hook, New Haven, New London, and Newport section; 10.05 p. m., continue northeast, Woods Holl and Narragansett section; 10.35 p. m., information signals at Eastport and Portland. 26th, 10.50 a. m., storm northeast at Portland and Eastport; 3 p. m., continue Boston and section. 29th, 9.55 a. m., northeast, Narragansett and Woods Holl section and Newport section. 30th, 10.30 p. m., northeast, Woods Holl, Henry, and Newport section; information at Sandy Hook. 31st, 10 p. m., southwest, Portland; southeast, Eastport; southwest, Boston and section; change to southwest, Woods Holl, Narragansett, and Newport section.

XV.—The general depression that had prevailed over the Rocky Mountain region from the 16th to 20th was evidently a southeastward extension of the low barometer that prevails in the northern Pacific, and is usually central in Bering Sea. A similar remarkable extension of the Atlantic low area will be recorded in the chapter on North Atlantic Storms. In the present case this depression culminated in the advance of low No. XV, which was off the coast of Washington on the 20th, a. m., and central in British Columbia on the 20th, p. m. It disappeared on the 22d, a. m., in Assiniboia, only to be followed immediately by No. XVI, which was central on the 22d, p. m., off the coast of Oregon.

XVI.—This depression passed northeastward into Alberta, where it was central on the 23d, a. m., while at the same time the low pressure prevailing to the westward showed that No. XVI was but the eastern end of a much larger depression. By the 25th this had become central in Manitoba, after which it began a remarkable southeastward movement, leaving its western companion, No. XVII, far in the rear. By the 28th,

p. m., No. XVI had reached the coast of South Carolina, and there are few instances on record in which the southeasterly movement of a low area has carried it so far to the east, the usual path being more southerly over Kansas, and possibly Indian Territory, with an occasional passage southward over Texas into the Gulf. Having reached the South Carolina coast low No. XVI turned northeastward and was off the middle Atlantic coast on the 28th, p. m., and off Cape Cod on the 29th, p. m., after which it appears to have died out.

In connection with this low area, the following signals were ordered: 24th, 5.30 p. m., southeast, Houghton, Marquette, Sault Ste. Marie, Green Bay and section, Mackinaw section; information signals at Milwaukee and section, Chicago, Grand Haven and section. 25th, 10.30 a. m., northwest, Lake Pepin, Duluth, and Ashland section; southeast, Alpena, information at Mackinaw and Saginaw Bay section; 5.30 p. m., northwest, Michigan, Houghton, and Marquette; southeast, Saginaw, Port Huron, and Sault Ste. Marie; 10.40 p. m., southwest, Lake Erie. 27th, 10.40 p. m., information at Norfolk, Cape Henry, and Newport News. 28th, 10.35 a. m., information at Delaware Breakwater; 1.40 p. m., storm northeast at Cape Henry; 10.50 p. m., information at Woods Holl and Narragansett Pier.

On the 26th, a. m., low No. XVI was moving rapidly southeastward, and as stated in connection with that area, this southeasterly movement was taking place far to the eastward of the ordinary track of low areas. It is natural to associate this movement with the fact that the center of the hurricane, XIV, was at that time moving northeastward along the middle Atlantic coast. These centers were less than 1,000 miles apart, east and west, on the 26th, a. m., and their movements may have mutually affected each other, but there is not much tangible evidence of this. The south and east movement of No. XVI changed on the 27th into a northeast movement as it followed No. XIV, which moved much more rapidly. That two such well-marked cyclones should cross each other's track and change their directions of motions in such close proximity to each other well illustrates the mobility of the atmosphere, and the fact that the motion of each area is influenced largely by the independent thermodynamic changes that are going on within its own boundary quite as much as by the dynamic phenomena of the general atmospheric motions.

XVII.—This was central on the 25th, p. m., in Alberta. It moved eastward and then suddenly southward until, on the 27th, a. m., it extended as an oval from Colorado to North Dakota; it then moved eastward, becoming a well-marked storm center on the 28th, and passed over Lake Superior; it broke up temporarily in the Lake region on the 30th, but developed into a new storm center that was central on the 31st in the St. Lawrence Valley.

In connection with this low area, the following signals were ordered: 27th, 9.30 p. m., storm northeast at Duluth, southeast at Marquette and Green Bay. 28th, 11 a. m., northwest at Duluth, Ashland, and Houghton; information signals at all other stations on lakes Superior, Michigan, and Huron.

XVIII.—On the 29th, a. m., this low area was central in Alberta, while high No. XI was central in Utah and low No. XVII was over Lake Superior. Area No. XVIII moved slowly eastward, and No. XVII almost entirely disappeared as a separate center until, on the 31st, a. m., they may be considered as having united north of the Lake region.

XIX.—This appeared on the 31st, p. m., in northern Alberta, and its further history belongs to November.



## NORTH ATLANTIC METEOROLOGY.

[Pressure in inches and millimeters; wind-force by Beaufort scale.]

## NORMAL CONDITIONS.

The normal barometric pressure for October over the North Atlantic Ocean, as deduced from international simultaneous meteorological observations taken at Greenwich noon and not reduced to standard gravity, is lowest, 29.70 (754), in a small oval including southern Iceland and southern Greenland. A similar oval of 29.70 (754) covers the North Pacific from the southern portion of Alaska to Kamchatka between N. 45° and N. 60°. The areas of highest pressure, 30.10 to 30.16, cover the eastern portion of the United States and the eastern portion of the North Atlantic Ocean, and also that portion of the Pacific immediately west of California. The isobar of 29.90 incloses a depression that extends from the coast of Labrador to southern Sweden and northeastward over the Polar Sea to the North Pacific Ocean.

As compared with September, the mean pressures in October are higher over the entire United States, and also over the Arctic regions and the whole of Asia. The maximum rise is 0.20 in central Asia, 0.10 in the Arctic region, and 0.10 in the central Rocky Mountain plateau.

The general path of storm centers in October is appreciably the same as for September. The general velocity of movement of storm centers moving eastward over the United States is 26 miles per hour, and over the Atlantic Ocean 19 miles; the velocity of the West Indian hurricanes moving westward, 16 miles, and during the time of recurving, when the motion is mostly northward, 9 miles.

## NORTH ATLANTIC STORMS.

The following paragraphs give some account of the areas of low pressure and strong winds on the North Atlantic Ocean during October, 1894. Daily charts are compiled at the Weather Bureau showing the atmospheric conditions over the United States, Europe, and the Atlantic Ocean, as nearly as practicable at Greenwich noon, and afford a basis for approximating the locations and paths of the more important areas of high and low pressure.

The individual low pressures are enumerated as follows:

A. This was central on the 1st, a. m., off the coast of New England, N. 38°, W. 67°, and was a continuation of area G of the month of September. The first few days of October, like the last few of September, presented numerous barometric depressions in the North Atlantic Ocean. On the 1st the hurricane area A was breaking up and by the 3d had merged with C and D, forming a large area central at N. 48°, W. 43°. The hurricane A was encountered by the steamship *Arabian Prince* on the 1st in N. 35° 40', W. 73° 20'. The combined low pressures A, C, and D moved slowly eastward and disappeared on the 6th at N. 57°, W. 23°.

B. This was the hurricane referred to as No. IV of the U. S. series. It appears to have begun on the 1st off the coast of Panama and Colombia, and passed northeastward between Cuba and Yucatan on the 6th, northward through the eastern portion of the Gulf of Mexico on the 7th and 8th, and northeast on the south Atlantic and mid-Atlantic coasts on the 9th and 10th. On the latter date it joined with low No. VII of the U. S. series, and on the 12th these were central over Newfoundland. On the 13th these united with low area F of the North Atlantic series, and the resulting depression broke up by the 16th. When passing through the Gulf, this hurricane was encountered by the *Cayo Romano* and the *Johann Ludwig* on the 8th in about N. 27° 50', W. 87° 45'; by the *Stephen Bishop* and *Acme* on the 9th. When passing over the Atlantic, this hurricane was encountered by the *Allah* and the *Ben. Nevis* on the 13th, by the *Tauric* and *Elmville* on the 14th, and by the *Anvers* on the 15th.

The low pressure that prevailed at the center of this hurricane and the intense violence of the winds over a very small region near the center are well shown by the following extracts from the log book of the *Johann Ludwig*, Captain Jespersen, which arrived at Pensacola in a disabled condition on the morning of the 14th:

October 6, 8 a. m., N. 28° 45', W. 86° 25', wind NE. 10, barometer 29.96; 8 p. m., N. 28° 38', W. 86° 35', wind E. to NE. 11, barometer 29.94. 7th, 8 a. m., N. 28° 22', W. 86° 58', wind E. to NE. 11, barometer 29.86; 8 p. m., N. 28° 15', W. 87° 25', wind E. 12, barometer 29.54. 8th, a. m., N. 28° 10', W. 88° 13', wind E. 12, barometer 28.38; 8 p. m., N. 28° 03', W. 87° 55', wind NW. 10, barometer 29.50.

From 8.30 a. m. to 10 a. m. of the 8th, nearly calm. Intensely disturbed sea. At 10 a. m. of the 8th, wind shifted to north and barometer began to rise rapidly. The strongest wind occurred about 2 p. m. of the 8th. At 6.30 a. m., of the 8th, rigging was cut away to save vessel from capsizing. The sea was full of foam; and the sea, air, and clouds had seemingly merged into one. After sundown of the 8th to the morning of the 9th, wind moderating from northwest; clear, settled weather by night of the 9th.

C. This was central on the 1st at N. 50°, W. 38°, as a severe hurricane center. It moved slowly northeastward, but was joined on the 3d by areas A and D, forming a resulting oval depression and whirl that occupied the greater part of the Atlantic between Cape Breton and Ireland, but which broke up on the 6th in N. 55°, W. 25°. Among the vessels that experienced this hurricane were the *Pomeranian*, *Washington*, and *Buenos Ayrean* on the 1st; *Barbedian*, *Braunschweig*, *Tancarville*, and *Unionen* on the 2d; *Veendam*, *Washington*, *Sachem*, *Saale*, *Barbedian*, and *Othello* on the 3d; *Hungaria*, *Scandinavian*, *State of Nebraska*, *Braunschweig*, and *Mimac* on the 4th.

D. This small disturbance appears on the maps of the 1st, 2d, and 3d. It moved from N. 40°, W. 55°, to N. 43°, W. 48°, after which it merged into the combined areas A and C.

E. This was central on the 6th, a. m., in Labrador, and was a continuation of No. I of the U. S. series. It passed eastward rapidly and was central on the 7th at N. 54°, W. 40°, after which the center moved northeast, passing between Iceland and Scotland on the 10th and North Cape on the 12th, at which time low pressure prevailed in a trough reaching from this region southwest beyond the Azores, within which were included at least three separate whirls. On the 13th this low pressure rapidly moved southward over northern Europe, and on the 14th was central near the southern end of Sweden. On the 16th it was central in Russia.

F. This was a continuation of U. S. series No. V, which was central north of the Lake region on the 8th, a. m., and on the coast of Newfoundland on the 10th, a. m. The center now moved rapidly toward the east-southeast, joining with the smaller hurricane center, and on the 11th, a. m., it was central at N. 44°, W. 39°. By the 12th this depression had enlarged and apparently included two distinct whirls, but as observations are missing from the central portion, we shall consider the general center at N. 45°, W. 30°. By the 13th this general depression had merged with B, forming an oval whose central lowest pressure was still not far from N. 45°, W. 30°. The two whirls B and F maintained their integrity until the 15th, by which time they had united into one central at about N. 48°, W. 30°, and by the 16th had disappeared, leaving only a small depression, which appears to have moved southeastward toward Portugal, and passing over that region on the 18th expanded into an extensive moderate depression over central Europe on the 19th. The following vessels reported low pressures and high winds in connection with this depression: *Hungaria*, *Scandinavia*, *Sedgemore*, *La Campine*, *Chicago*, *Martello*, and *Elmville* on the 9th; *Bovic*, *Virginia*, *Werra*, and *Durham City* on the 10th; *British Empire* on the 12th.



G. This was the hurricane No. XII of the U. S. series. On the 10th pressure had begun to fall, and the winds had begun to show a cyclonic whirl off the coast of Venezuela west of Trinidad. This whirl moved slowly northward, and on the 12th, noon, was near Martinique, approximately central at N. 15°, W. 63°. It was at this time undoubtedly of small dimensions.

At Port au Prince, Haiti, the observer noted low pressure on the 14th, noon, which continued until the 18th, noon, with clear weather, light winds, and no rain.

Mr. Jos. Ridgway, Jr., observer at St. Thomas, sends the following account of the weather attending the hurricane:

On the 13th, evening, it was reported here that there was a hurricane to the southwest of Barbados, but the daily weather reports did not indicate anything so serious, though it had been quite plain some days that there was an evident barometric depression which indicated heavy rain (not unusual at this season), but nothing more. However, late at night (13th) and early morning we had wind strong from east to southeast, then south and southwest, with torrents of rain. Beginning on the night of the 12th, the rainfall here varied in different localities of the island from 70 to 100 lines (9 to 12 inches). Strange to say, at St. Croix there were but 30 lines. Judging from damage reported, wind must have blown at St. Lucia with hurricane force. Information from Vieuxfort (south side) reports great damage to property in that district, many factories being wrecked, the English church also being destroyed, and the cane crop totally gone at Calderac and Deunery. The fields were quite submerged, and the sugar and cocoa crops of this island are considered to be entirely destroyed. Serious landslips and all roads blocked.

By the 14th, noon, the center had passed to the north of St. Thomas, and had become the southern whirl in a depression that stretched northward to the St. Lawrence and included in its northern portion the low area No. IX of the U. S. series. According to the reports of the steamship *Herschel*, which left Santa Lucia at 1 p. m. of the 12th for New York, she was in the center of this whirl on the 16th, from 10 a. m. to 8 p. m., during which period the barometer was always below 28.20 and was lowest, 27.50, at 4 p. m. This low pressure is one of the lowest on record at sea level. The location was about N. 25° 40' and W. 66° 35'. The hurricane winds and blinding rain that accompanied this center were of the severest type. At Bermuda, on the 16th, at 7 a. m., the barometer was 30.13, wind northeast, force 6, with indications of the approaching hurricane. On the 17th, 7 a. m., the barometer was 29.94, southeast, force 3, with heavy surf from the south; at noon, 29.47, southeast, force 7; at 2 p. m., 29.45, northeast, force 9; at 4 p. m., 29.68, northeast, force 7, with a surf from the southeast, whence we infer that the storm center passed on the eastern side of Bermuda. On the 18th, noon, it was apparently central at N. 34°, W. 60°, and was now the southern portion of a depression that extended northward beyond Labrador and included the low area No. XI of the U. S. series. As usual in such cases, the southern whirl now began to rapidly die out and had disappeared on the 20th, while the northern center expanded and continued. Among the vessels experiencing this hurricane were the *San Giorgio* and the steamship *Herschel* on the 16th. The reports from numerous stations in Cuba on the 13th, 14th, 16th, and 17th show that the low pressure throughout the island and the gusty, rainy weather induced considerable anxiety lest another hurricane similar to that of September was about to visit the island, and telegrams of information were widely distributed both by the authorities of Cuba and the United States.

Mr. Rafael Junquera, observer at St. Jago de Cuba, communicates the following extracts from the log book of the captain of the Spanish steamer *Antinog y Menendez* coming from Manzanillo to that port; the steamer had to go into Niquero, a small port on the other side of Cape Cruz, to protect herself from the storm:

Left Manzanillo for St. Jago de Cuba at 10.30 a. m., October 17, 1894; barometer, 29.93; thermometer, 79. 2 p. m., barometer, 29.85; thermometer, 80; wind moderate from northeast, sky cloudy, drizzling. 3 p. m., barometer, 29.80; thermometer, 80; wind fresh from southeast with violent gusts and torrential rain; lower clouds moving with moderate velocity from east-

southeast, cumulus clouds from south-southwest. 4.30 p. m., barometer, 29.79; thermometer, 77. 5.30 p. m., barometer, 29.70; thermometer, 77. 6 p. m., minimum barometer, 29.67; thermometer, 78; anchored at Niquero; wind strong from southeast and much rain; the gusts of wind were very violent, inclining to southerly; lower clouds moved with great velocity from southeast, cumulus from southwest. 8 p. m., barometer, 29.74; thermometer, 79; wind weak from second and third quadrants; continuous rain; lower clouds moving at intervals with great velocity. 10 p. m., barometer, 29.70; thermometer, 79. At midnight the wind changed to the southwest; rain. 3 a. m., wind became weaker from first quadrant; mist. 2 p. m., wind southeast and south; squalls. 8 p. m., wind south-southwest followed by rain. 3 a. m., October 19, rain ceased, weather improving; barometer rising very slowly.

The schooner *B. Frank Nealley*, on her route from New York to Puerto Rico, passed near the vortex of this storm in N. 30°, W. 71° on the 26th, at 3 a. m., when she had a north-northwest gale of about 70 miles, with the barometer 29.30, the wind having veered 8 points in twelve hours. The vessel was at one time probably within 100 miles of the center of the storm.

H. This was the hurricane low No. XIV of the United States series. On the 20th the circulation of the winds indicated the presence of a disturbance north of the Windward Islands, central at about N. 20°, W. 60°; this moved slowly westward and by the 22d was at N. 23°, W. 64°, and by the 24th, at N. 26°, W. 74°, at which time it was turning toward the north and northwest, and by the 26th, noon, it was central at N. 36°, W. 68°. The northeasterly course of this storm was very rapid, being central on the 28th at N. 46°, W. 46°; on the 29th, N. 49°, W. 40°; here its rapid progress ceased, being central on the 30th at N. 48°, W. 34°; 31st, N. 50°, W. 30°. On this latter date this area had approached the low area described under I as resulting from the breaking up of the area I G and which was then near the coast of Great Britain. Among the many vessels that encountered this storm were the following: *La Flandre*, *Manitoba*, *Francisco*, and *Spain*, all of which report pressure below 28.8 on the 28th; *Massachusetts*, *American*, *Donau*, and *Maryland*, which report the lowest pressure, 28.2, on the 29th; *Amsterdam* on the 30th.

I. This was a continuation of low No. IX of the U. S. series, which was central over Lake Huron on the 13th, noon, and over the mouth of the St. Lawrence on the 15th, noon. At this time the hurricanes B and G were respectively east and south of I, and an extensive area of high pressure was extending southwestward over Iceland and the North Atlantic, while an equally extensive area of low pressure was advancing southeastward over the Dominion of Canada. Under these circumstances the low area I ceased its eastward motion on the 15th and was overtaken by the depression approaching from Canada, which was No. XI of the U. S. series. The combined area was central in Labrador on the 17th, while the hurricane G extended and was included in the same general depression. On the 18th I was central near the Straits of Belle Isle, and on the 19th at about N. 53°, W. 50°. After this date the hurricane G died away or was merged into I and the combined depressions extended on the 20th as an oval trending northwest and southeast and central at about N. 50°, W. 37°, while the combined depressions B and F were in the Bay of Biscay. On the 21st these low areas B F and I G formed the eastern and western end of a trough that reached from Newfoundland to Denmark, and on the 22d, noon, this trough of 29.7 had extended southwestward by combination with the hurricane H, so that it stretched from the Bahamas over Bermuda and the Azores to southern Ireland and England and western France, while a little farther to the east an adjoining depression extended into Russia. This long trough, which is a phenomenon rarely presented on the Atlantic, was immediately broken up by the rapid movement of an area of high pressure southeastward over the United States and a corresponding movement northward over the Mediterranean, so that the map of the 24th shows the depression I G central as a



severe storm over Ireland and the hurricane *H* central near the Bahamas, while high pressures prevailed between these two depressions as also over central Europe and over the United States. From the 25th to the 30th *I G* broke up into several whirls, some of which moved northeastward over Sweden and others lingered in the neighborhood of Great Britain. Among the vessels that encountered the low areas *I* and *I G* were the *Obdam*, *Hecla* and *Meier* on the 18th; *Brazilian* and *Pomeranian* on the 19th; *Bayonne* and *Zaandam* on the 20th; *Hecla* and *Suram* on the 23d; *Pomeranian*, *Manitoba*, *Venetia*, *Donau*, and *Acme* on the 24th; *Venetia* and *Christine* on the 25th.

## OCEAN FOG.

The limits of fog belts west of the fortieth meridian, as reported by shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 13 dates; between the fifty-fifth and sixty-fifth meridians on 5 dates; and west of the sixty-fifth meridian on 3 dates. Compared with the corresponding month of the last seven years, the dates of occurrence of fog near the Grand Banks numbered 1 less than the average; between the fifty-fifth and sixty-fifth meridians, 1 more than the average; and west of the sixty-fifth meridian, the number was the average for October.

## OCEAN ICE.

The positions of icebergs and field ice reported for October, 1894, are shown on Chart I by crosses.

The following table shows the southern and eastern limits of the regions within which icebergs or field ice were reported for this month during the last twelve years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
October, 1883.....	46 56	46 22	October, 1883.....	46 56	42 22
October, 1884.....	Off Cape Race.		October, 1884.....	46 56	50 55
October, 1885.....	48 21	47 12	October, 1885.....	48 21	47 12
October, 1886.....	41 34	49 43	October, 1886.....	46 03	46 37
October, 1887.....	42 58	50 02	October, 1887.....	42 58	50 02
October, 1888.....	51 43	55 36	October, 1888.....	51 43	55 36
October, 1889.....	44 32	49 28	October, 1889.....	46 30	45 59
October, 1890.....	44 47	49 33	October, 1890.....	47 56	45 45
October, 1891.....	48 04	48 27	October, 1891.....	48 04	48 27
October, 1892.....	Straits of Belle Isle		October, 1892.....	52 34	51 06
October, 1893.....	49 57	59 32	October, 1893.....	52 47	51 16
October, 1894.....	45 11	49 05	October, 1894.....	48 33	48 10
Mean.....	46 24	50 30	Mean.....	48 17	48 37

Ice was reported south of the fiftieth parallel on 11 dates: 1st, 2d, 3d, 4th, 11th, 12th, 13th, 14th, 16th, 19th, and 21st. For October, 1893, ice was reported south of the fiftieth parallel only on 2 dates. In an area extending from the Straits of Belle Isle to near the fifty-second meridian ice was reported on 6 dates: 1st, 2d, 5th, 6th, 10th, and 11th. The southern limit of ice was about one and one-half degrees south of the average southern limit for October; and the easternmost ice reported was about one-half degree east of the average.

## TEMPERATURE OF THE AIR.

[In degrees Fahrenheit.]

The distribution of the monthly mean temperature of the air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

## DIURNAL PERIODICITY.

The regular diurnal period in temperature is shown by the hourly means given in Table V for all stations having self-registers.

## NORMAL TEMPERATURE.

In Table II, for voluntary observers, the mean temperature is given for each station, but in Table I, for the regular stations of the Weather Bureau, both the mean temperatures and the departures from the normal are given for the current month. In the latter table the stations are grouped by geographical districts, for each of which is given the average temperature and departure from the normal; the normal for any district or station may be found by adding the departures to the current average when the latter is below the normal and by subtracting when it is above.

## DEPARTURES FROM NORMAL TEMPERATURE FOR OCTOBER, 1894.

As compared with the normal for October the mean temperatures for the current month were decidedly in excess in Ontario, Quebec, and southwestward to Kansas, Nebraska, and Texas. The ridge of greatest excess includes the following: Rockliffe, 5.2; Chatham, 4.2; Kingston, 4.0; Parry Sound, 4.3; Topeka, 5.8; Wichita, 3.7; Dodge City and Abilene, 3.6.

Considered by districts, the mean temperatures for the current month show the following departures from normal temperatures:

Positive departures: New England, 2.1; middle Atlantic, 0.9; west Gulf, 1.1; Ohio Valley and Tennessee, 0.7; lower Lake, 2.0; upper Lake, 1.7; North Dakota (extreme northwest), 1.4; upper Mississippi, 1.3; Missouri Valley, 2.4; northern slope, 2.0; middle slope, 3.2; southern slope (Abilene), 3.6; southern plateau, 2.2; middle plateau, 1.8; northern plateau, 0.2; north Pacific, 1.0; south Atlantic, 0.0.

Negative departures: Key West, 1.3; east Gulf, 0.3; north Pacific, 1.4; southern Pacific, 0.3.

For certain voluntary stations of rather long periods of observation the normal and extreme mean temperatures and the departures are shown in detail in Table Xa, which is now placed among the meteorological tables instead of being inserted in the text as heretofore.

## YEARS OF HIGHEST MEAN TEMPERATURE FOR OCTOBER.

The mean temperature for October, 1894, was the highest on record at regular Weather Bureau stations as shown in the following table, which also gives the highest previous record:

Stations.	October, 1894.		Highest previous.	
	Mean temperature.	Departure from normal.	Temperature.	Year.
Corpus Christi, Tex.....	74.8	+1.8	74.7	1892
Palestine, Tex.....	69.8	+3.1	69.7	1883
Abilene, Tex.....	68.8	+3.6	69.1	1893
Wichita, Kans.....	61.4	+3.7	59.8	1893
Topeka, Kans.....	59.9	+5.8	59.3	1892
Kansas City, Mo.....	59.4	+2.9	59.0	1892
Pueblo, Colo.....	54.4	+2.4	53.2	1889
Cheyenne, Wyo.....	49.2	+3.2	48.3	1875
Parkersburg, W. Va.....	56.0	+1.7	55.6	1893
Vineyard Haven, Mass.....	56.6	+3.5	56.4	1893
Nantucket, Mass.....	54.9	+1.1	54.2	1893
Northfield, Vt.....	47.8	+3.7	47.6	1893

## YEARS OF LOWEST MEAN TEMPERATURE FOR OCTOBER.

The mean temperature for October, 1894, was not the lowest on record at any regular Weather Bureau stations.

## MAXIMUM TEMPERATURE.

The maximum temperatures of the month at regular stations of the Weather Bureau are given in Table I, from which it appears that the highest maxima were: Yuma, 101; Tucson, 97; Los Angeles, 96; Red Bluff, 95; San Luis Obispo, 94; Abilene, 93; Sacramento, Fresno, and Oklahoma, 92; El Paso, 91; Corpus Christi, Montgomery, and Jacksonville, 90.

The lowest maxima were: Tatoosh Island, 58; Eastport, 61; Port Crescent, 62; Port Angeles, 63; Neah Bay, East Clallam, and Sault Ste. Marie, 64; Pysht, 65; Fort Canby, 66.

## YEARS OF HIGHEST MAXIMUM TEMPERATURE FOR OCTOBER.

The maximum temperatures for October were the highest on record at regular Weather Bureau stations, as shown in the following table:

Stations.	October, 1894.		Highest previous.	
	Maximum.	Excess above previous record.	Temperature.	Year.
Tucson, Ariz.....	97	0	97	1881
Corpus Christi, Tex.....	90	0	90	"
San Francisco, Cal.....	89	+ 2	87	"

\* Frequently.

## MINIMUM TEMPERATURE.

The minimum temperatures of the month at regular stations of the Weather Bureau are given in Table I, from which it appears that the lowest minima were: Lander, 15; Helena, 16; Idaho Falls and North Platte, 18; St. Vincent, 19; Pueblo and Valentine, 20; Denver, Cheyenne, Santa Fe, Bismarck, and Williston, 21.

Among the highest minima were: Key West, 70; Jupiter, 62; Tampa, 57; Titusville, 56; Jacksonville and Port Eads, 52; Charleston and Pensacola, 50.

## YEARS OF LOWEST MINIMUM TEMPERATURE FOR OCTOBER.

The minimum temperatures for October were the lowest on record at regular Weather Bureau stations, as shown in the following table:

Stations.	October, 1894.		Lowest previous.	
	Minimum.	Deficit below previous record.	Temperature.	Year.
San Diego, Cal.....	45	0	45	1872

## MONTHLY MEAN TEMPERATURE.

For the regular stations of the Weather Bureau the monthly mean temperature is the simple mean of all the daily maxima and minima; for voluntary stations a variety of methods of computation is necessarily allowed, as shown by the notes appended to Table II.

During October, 1894, the highest mean temperatures at regular Weather Bureau stations were: Key West, 77.7; Jupiter, 76.0; Corpus Christi, 74.8; Yuma, 74.6; Galveston, 74.4. The lowest mean temperatures were: St. Vincent, 42.4; Havre, 45.0; Bismarck, 45.1; Port Crescent, 45.2; Pysht and Port Angeles, 46.8.

## DAILY AND MONTHLY RANGES OF TEMPERATURE.

The greatest daily range of temperature is given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station:

*Greatest daily ranges.*—Large values: Rapid City, 52; North Platte, 51; Pueblo, 50; Valentine, 49; Lander, 48; Idaho Falls, 47; Denver and Winnemucca, 46; Tucson and Fort Smith, 45; Abilene and Dubuque, 44; Havre, 43; Yuma,

Carson City, Topeka, Huron, St. Vincent, and La Crosse, 42. Small values: Tatoosh Island, 12; Key West, 15; Hatteras and Fort Canby, 16; Block Island, 17; Nantucket, Astoria, and Port Angeles, 18; Jupiter, 19; Galveston and Seattle, 20.

*Extreme monthly ranges.*—Large values: Pierre, 66; Valentine and North Platte, 65; Pueblo, 64; Topeka, 61; El Paso, 60. Small values: Key West, 17; Tatoosh Island, 18; Fort Canby, 24; Jupiter, 25; Nantucket, 28; Block Island, 29.

## LIMITS OF FREEZING TEMPERATURE.

The region within which the air has had a freezing temperature at some time during the month is bounded by the isotherm of minimum 32°. The isotherm of minimum 40° presents, approximately, the boundary of the region within which severe frosts are likely to have occurred. During the winter season these lines are shown on the chart of snowfall, No. V.

The line of minimum 40° passes from Delaware southwest to northern Georgia, and thence west to central Texas.

The line of minimum 32° passes from northern Maine southwest to northern Texas, and thence northwest to Alberta.

## ACCUMULATED TEMPERATURES.

From January 1 to the end of the current month the average temperature for each geographical district was above or below the normal by an amount that is given in the last column of the following table. The accumulated monthly departures from normal temperatures, as given in the second column, may be used for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
New England.....	+12.6	+1.3	Key West.....	-5.9	-0.6
Middle Atlantic.....	+16.1	+1.6	Southern plateau.....	-14.5	-1.4
South Atlantic.....	+7.0	+0.7	Middle plateau.....	-8.7	-0.9
East Gulf.....	+0.1	0.0	Northern plateau.....	-3.8	-0.4
West Gulf.....	+0.9	+0.1	Northern Pacific.....	-9.0	-0.9
Ohio Valley and Tennessee.....	+15.5	+1.6	Middle Pacific.....	-10.5	-1.0
Lower Lake.....	+24.7	+2.5	Southern Pacific.....	-21.9	-2.2
Upper Lake.....	+29.1	+2.9			
North Dakota (Ex. N.W.).....	+25.5	+2.6			
Upper Mississippi.....	+26.0	+2.6			
Missouri Valley.....	+22.6	+2.3			
Northern slope.....	+6.1	+0.6			
Middle slope.....	+7.9	+0.8			
Southern slope (Abilene).....	+4.9	+0.5			

## PERIODS OF HIGH TEMPERATURE.

The maximum temperatures of October occurred principally at the following periods:

(A) On the 1st the maximum temperature of the month occurred in Mississippi, Alabama, and North and South Carolina. On the 2d this warm wave had extended northward so as to affect the greater part of the Gulf and south Atlantic States, on the 3d it covered the middle Atlantic States, and on the 4th southern New England.

(B) The maximum temperature of the month occurred on the 3d at a few stations in Washington, Oregon, and California, and on the 4th throughout nearly the whole of the Pacific States and Arizona; on the 5th and 6th this warm wave reached New Mexico and Colorado.

(C) On the 15th the highest temperatures occurred in the northern portions of Minnesota and Montana. During the 16th this warm wave spread southward into Nevada, Idaho, Wyoming, South Dakota, Iowa, Wisconsin, Michigan, and Lake Huron. This southward movement continued, and by the 19th or 20th had covered Kansas, Indian Territory, Missouri, Illinois, Indiana, and northern New England. This was the closing warm wave of the month, and it ended by



bringing the maximum temperature of the month to Arkansas on the 23d.

#### PERIODS OF LOW TEMPERATURE.

The minimum temperatures of October occurred principally at the following periods:

(A) On the 7th in Montana and Idaho, and on the 8th or 9th at a few stations in South Dakota, Nebraska, Missouri, Wisconsin, and Upper Michigan.

(B) On the 13th or 14th the minimum of the month generally occurred throughout the upper Mississippi Valley and the upper Lake region; this low temperature moved southward, and by the 15th had brought the minimum temperature to Tennessee, Alabama, Georgia, the interior of North and South Carolina, and the greater part of the Appalachian region and southern New England. On the 16th the minima occurred along the entire coast from South Carolina to Maine.

(C) On the 28th the lowest temperatures occurred at Salt Lake City, Laramie, Sacramento, and Fresno. By the 29th this low temperature had spread southward over portions of Arizona, New Mexico, and Colorado, and by the 30th over Texas, Louisiana, Kansas, and North and South Dakota, and by the 31st over Missouri, Arkansas, and northern Florida.

#### REGIONS OF 20° RISE IN TWENTY-FOUR HOURS.

The daily weather charts show by heavy dotted lines the regions within which the temperature has risen 20° in the preceding twenty-four hours. The following list enumerates all of these regions and gives the dimensions of the principal axes in miles:

- (A) 1st, a. m., Colorado and Nebraska, 500 by 200.
- (B) 2d, a. m., Illinois and Wisconsin, 300 by 100.
- (C) 3d, a. m., West Virginia and Ohio, 200 by 100.
- (D) 8th, p. m., Montana and Nebraska, 400 by 100; 9th, a. m., South Dakota, Wyoming, and Colorado, 500 by 300. This area of rising temperature in advance of high area No. IV, and in the rear of low No. VII, which was then central in Manitoba, can hardly be explained, except as being due to the dynamic warming of the descending air.
- (E) 16th, a. m., Kentucky, Indiana, and Ohio, 300 by 200. This is a case of a warm area between high pressure No. V on the south and low No. XI on the north; southerly winds and cloudy morning skies were followed by southerly winds with a clear sky. The warm area was on the north or descending side of the Appalachians, and if there was a slight dynamic warming, it must have been superadded to the clear sunshine.
- (F) 20th, a. m., 100 by 200, Manitoba and Minnesota. This rise of 20° must be attributed to the change from cold north-east winds and clear sky to warm southerly winds and cloudy weather.
- (G) 23d, a. m., 300 by 200, western Montana. This warm area was immediately to the south of low No. XVI, which was then central in Assiniboia and Alberta; southerly winds were blowing down the northern Rocky Mountain slope; the clear skies had become clouded and rain was rapidly approaching; sunshine had been cut off from the surface of the ground, but the protection from radiation and the direct radiated heat from the clouds and the dynamic warming of the chinook wind must have combined to produce this rise in temperature. 24th, a. m., the rise in temperature shown by the preceding map extended rapidly south and east, and now covered the region from Assiniboia to Kansas and Wyoming, averaging 400 by 600. The maximum rise in temperature in twenty-four hours was 32°, at Rapid City, where the sky had remained clear throughout with southerly winds, so that no doubt can remain that high area No. X, off the coast of California, which produced the southwest winds and rain throughout the western Rocky Mountain slope, as shown on this map, was now producing the föhn wind on the eastern slope.

(H) 30th, a. m., 400 by 200, Montana and Assiniboia; the maximum rise in twenty-four hours was 24° at Havre and Swift Current. This warm region was located with reference to low No. XVIII, precisely as was the preceding region (G) with reference to its low area, and the rise in temperature must have been principally of dynamic origin.

(I) 31, a. m., 300 by 100, Nebraska and South Dakota. This warm region represented a change from cold westerly winds and clear sky to warm northwest winds and partly cloudy weather; the greatest rise was 24° at Valentine. On the 31st, p. m., this area appeared in Missouri, 300 by 100.

#### REGIONS OF 20° FALL IN TWENTY-FOUR HOURS.

A fall of temperature of 20°, or more, in twenty-four hours is indicated on the Daily Weather Map by inclosing the region within which this occurs by a heavy dotted line. According to recent instructions such falls are no longer to be regarded as technical cold waves, the exact definition of which is given in the subsequent paragraph. The following list enumerates the regions of 20° fall for the month of October and the dimensions of the principal axes are stated in miles:

- (A) 1st, a. m., 400 by 100, Lake Huron and Ohio.
- (B) 3d, p. m., 200 by 100, Iowa, Illinois, and Wisconsin.
- (C) 6th, p. m., 800 by 400, Montana, Idaho, Wyoming, and western Nebraska. 7th, a. m., 300 by 300, Wyoming and Colorado; 7th, p. m., 800 by 300, Wisconsin, Iowa, Nebraska, Kansas, Colorado, and Texas. 8th, a. m., three small areas, 100 by 100, Minnesota; 300 by 200, Missouri, and 100 by 100 in Indian Territory; 8th, p. m., two small areas, 200 by 100, Indiana and Ohio; 100 by 100, Mississippi. 9th, a. m., two small areas, 100 by 100, Ohio; 200 by 200, Mississippi.
- (D) 10th, a. m., 400 by 200, Wyoming and Colorado.
- (E) 16th, p. m., 200 by 100, Assiniboia. 17th, a. m., 200 by 300, Alberta and Saskatchewan.
- (F) 25th, p. m., 100 by 100, South Dakota. 26th, a. m., 600 by 400, South Dakota, Nebraska, Kansas, Colorado, and Indian Territory.
- (G) 28th, a. m., 300 by 200, Utah and Colorado; 28th, p. m., three areas stretching almost continuously from Minnesota to central Texas, 1,100 by 200. 29th, a. m., 100 by 100, northern Texas; 29th, p. m., 100 by 200, Illinois.
- (H) 31st, a. m., 300 by 300, Alberta, Assiniboia, and Montana.

#### COLD-WAVE SIGNALS FOR OCTOBER.

According to recent instructions (No. 75 of 1894) the cold-wave signal, namely, the white flag with black center, will be displayed during the months of March to November, inclusive, whenever, in the judgment of the forecast official, the fall of temperature in twenty-four hours is expected to be at least 18° and to reach at least 32° in the district north of Arkansas and between the Mississippi River and the Rocky Mountains, including Minnesota; at least 16° and to reach 36°, in the region of Tennessee and North Carolina and east of the Mississippi River, including St. Louis; at least 16° and to reach 40°, in all other districts east of the Rocky Mountains, except along the Gulf coast and in Florida; at least 16° and to reach 42°, along the Gulf coast and in Florida. During the months of December, January, and February the first limit remains the same, but the second limit is placed 6° lower. When cold-wave signals are not ordered and the temperature falls 4° more than the first limit and reaches to 4° below the second limit, such falls will be considered as cold waves without signals.

In accordance with these instructions, the following cold-wave signals were ordered during the month of October:

- 6th, p. m., Huron and Moorhead.
- 7th, a. m., Yankton, Omaha, Concordia, Wichita, Topeka, St. Paul, Minneapolis, Des Moines, Dubuque, Davenport, Keokuk, Sioux City, and La Crosse.



25th, a. m., Rapid City, Pierre, Huron, Yankton, Denver, Pueblo, Valentine, North Platte, Omaha, Concordia, Wichita, Dodge City, and Kansas City.

27th, a. m., Rapid City, Cheyenne, Denver, and Pueblo.

28th, a. m., Omaha, Concordia, Wichita, Topeka, St. Paul, Moorhead, Duluth, Minneapolis, Des Moines, Dubuque, Davenport, Keokuk, Sioux City, Springfield, Mo., Columbia, Kansas City, and La Crosse.

#### DEW AND HOAR FROST.

The invisible moisture in the atmosphere condenses upon cold surfaces when the latter are cooled below the so-called dew-point. No method of measuring the amount of this deposition has as yet been introduced into use at Weather Bureau stations owing, in part, to the necessary delicacy and expense of the apparatus. This deposit of dew is quickly evaporated by the wind and sunshine; it is, therefore, only a temporary abstraction from the atmosphere; it does not enter into the sap of a plant unless it drops on the ground and penetrates as water to the roots. When frost-work and dew are deposited on elevated and dry places, such as the tops of houses, rocks, and mountains, the vapor may be considered as abstracted from the free atmosphere, but when they are deposited near the surface of the ground in damp, wet places, the vapor must be considered from the following different point of view. There is a steady and slow movement of the water from the lower strata of the soil up toward the surface where it is evaporated into the free atmosphere; during the daytime the wind carries this moisture away, but during the nighttime the still air near the surface of the ground becomes saturated for two reasons, namely, first, it is cooled by contact with the cool ground and, second, the moisture from the warm layers of soil a few inches below the surface continues to rise, and as it is not carried away by the wind, saturates the adjacent air and deposits itself, either as dew or frost, upon every blade of grass, or, as ice needles just below the topmost layer of gravel; such deposits are, therefore, simply one step in the transition from soil water to atmospheric vapor. The ice formation is oftentimes very important; a mass of needles, several inches high and covering a large area almost continuously, represents a layer of water of that depth and shows how much moisture would be given up by the soil to the air were it not retained by freezing at the surface. These ice needles are eventually thawed in the sunshine and, at least in part, remain in the soil as water. The frozen ground, or "depth to which frost penetrates," presents a similar case of soil moisture converted into ice on its way up into the atmosphere, and which by being frozen is not only itself saved to the soil, but becomes a barrier that prevents the water at greater depths from being lost during the winter, and in this respect, therefore, acts as beneficially as a layer of snow.

Observers who can keep a record of the amounts of dew, or frost, or the depth of frozen ground, would confer a favor by reporting these items from month to month.

#### FROSTS.

The frosts reported by the voluntary observers of the Weather Bureau usually have reference to the injury done to tender plants, and the classification "light" or "heavy" depends almost entirely upon the nature of the plant. In general, it may be assumed that a light frost will injure the most sensitive vegetables that are raised by methods of forcing, while the heavy frosts will injure hardy fruits and grains that ripen in the open air. In both cases, however, the extent of the injury will largely depend upon the location of the plant, namely, whether in a quiet valley or on an elevated spot. The meteorological phenomenon of hoar frost accompanies the occurrence of a frost properly so called by the agriculturist; a freezing temperature without hoar frost is a

dry freeze or a cold wave, according to its intensity. The isotherms of minimum 40° and minimum 32° are shown on Chart V.

The principal frosts of October occurred in the southern portion of the United States as follows; Alabama, 10th, 31st; Arkansas, 9th, 30th; Georgia, 14th, 16th; Louisiana, 9th, 30th; New Mexico, 28th, 29th; Texas, 29th, 30th; California, 28th, 29th.

The following table shows the dates of the occurrence of the first light and heavy frosts and the first snow of the season at the respective stations. When the observer makes no mention of frost the first occurrence of a minimum temperature of 32° is selected and the date is given in the table. The dagger at the right of the name of the station indicates, therefore, a minimum temperature of 32° with or without frost:

*Dates of first light and heavy frosts and snow, October, 1894.*

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<b>Alabama.</b>				<b>Colorado—Cont'd.</b>			
Brewton †		30		Hugo †		30	
Carrollton †	31			Husted		28	
Decatur	10			Julesburg		5	
Evergreen	15			Kit Carson †		16	
Florence	10			Las Animas †		7	
Greensboro	10			Loveland		7	
Maple Grove	10	15		Pagoda (near)		26	
Mobile	31			Paonia		28	
Montgomery	10			Pueblo		8	
Mount Willing	10			San Luis		28	
Newbern	10			Seibert		6	
Newburg				Thon		7	
Oneonta †		15		Vernon †		28	
Opelika		31		<b>Connecticut.</b>			
Rock Mills	10			Bridgeport		7	
Scottsboro	14			Canton		16	
Union	10			Hartford		16	
Union Springs	15			Middletown		16	
Valley Head	6	14		New Hartford		16	
<b>Arizona.</b>				New Haven		16	
Rye		29		New London		16	
Wilgus	1			North Grosvenor Dale †		7	
<b>Arkansas.</b>				Norwalk		19	
Bee Branch		8		Southington		7	
Blanchard Springs		9		South Manchester		16	
Camden		9		Voluntown		12	
Conway		9		Waterbury †		10	
Corning		9		<b>Delaware.</b>			
Fayetteville		5		Milford		12	
Fort Smith		9		Millboro		15	
Hot Springs †		31		Newark		12	
Keesee Ferry		8		Seaford		12	
Kirby †		30		<b>District of Columbia.</b>			
Little Rock		9		Washington		7	15
Lonoke		9		<b>Georgia.</b>			
Luna Landing		9	31	Adairsville		15	
Malvern		9		Athens		14	
Mount Ida		9		Atlanta		14	
New Gascony		9	31	Augusta		16	
Newport		9		Blakely		31	
Osceola		9		Brag		15	
Ozark		9		Clayton		6	14
Pine Bluff		31		Dahlonega		6	15
Poahontas		8		Diamond		5	18
Prescott		9	30	Dublin		16	
Rison		9	30	Forayth		15	
Russellville		9	30	Griffin		30	
Stuttgart		9	30	Hephzibah		15	
Texarkana †		30		Lafayette †		6	15
Washington		9		Lagrange		14	
Winslow		9		Marietta		14	
<b>California.</b>				Marshallville		15	
Ager †		26		Morgan		10	31
Cedarville		5		Ramsey		5	6
Centerville		27		Rome		14	15
Cloverdale		11		Thomasville		31	
Edmonton			20	Tooea †		15	
Healdsburg		12		Waynesboro		16	
Independence		1		<b>Idaho.</b>			
Kernville		1		Fraser			20
Neenach †		29		Idaho Falls			27
Sacramento (V. O.)		28		Lewiston †			7
Santa Clara †		28		Martin			19
Shasta Springs		25		Payette			5
<b>Colorado.</b>				<b>Illinois.</b>			
Abbott		28		Albion		14	
Breckenridge		1		Aurora		6	
Byers †		27		Braidwood		14	
Cope †		7		Bushnell		14	
Denver		7		Cairo		9	14
Divide Exper'l Station		27		Carlinville		9	
Deer Trail †		7		Carrollton		9	
Dumont		28		Chicago		1	
First View †		7		Decatur		9	
Fleming		7		East Peoria		6	
Gold Hill †		2		Fort Sheridan		14	
Grand Junction †		28		Galva		6	



## Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<i>Illinois—Cont'd.</i>				<i>Iowa—Cont'd.</i>			
Golconda.....	11			Ogden f.....	8		
Greenville.....	9			Osceola.....	8		
Griggsville.....	9			Oskaloosa f.....	9		
Havana.....	9			Ottumwa.....	9		
Herrins Prairie.....	8			Ovid.....	29		
Jordans Grove.....	9			Panama.....	29		
Lagrange f.....	14			Richland.....	6		
Louisville.....	9			Rock Rapids.....	29		
Martinsville.....	1			Sac City.....	8		
Mascoutah f.....	14			Seymour.....	9		
Mattoon.....	9			Sibley.....	29		
Monmouth.....	9			Sioux City.....	29		
Mount Pulaski.....	9			Spirit Lake.....	3		
Olney.....	14			Toledo.....	9		
Ottawa.....	6			Villisca f.....	28		
Palestine.....	10			Washington.....	9		
Peoria.....	14			Waukegan.....	30		
Philo f.....	1			Webster City.....	31		
Rantoul.....	6			Wilton.....	6		
Riley.....	6			Winterset.....	30		
St. John f.....	14			<i>Kansas.</i>			
Springfield.....	6			Abilene f.....	8		
Sycamore.....	9			Allison.....	28		
Tuscola.....	14	30		Altova.....	8		
Walnut.....	6			Atchison.....	30		
Zion.....	9	30		Beloit.....	7		
<i>Indiana.</i>				Blaine.....	29		
Angola.....	14			Burlington.....	8		
Bedford.....	6			Colby.....	28		
Cambridge City.....	6			Coldwater f.....	8		
Columbia City f.....	14			Columbus.....	8		
Columbus.....	15			Concordia.....	8		
Connorsville f.....	10			Coolidge.....	29		
Degonia Springs f.....	14			Cunningham.....	8		
Delphi.....	10			Dodge City.....	8		
Evansville f.....	14			Eldorado.....	29		
Farmland f.....	9			Elk City.....	8		
Hammond f.....	8			Englewood.....	10		
Huntingburg.....	5			Eureka Ranch.....	7		
Huntington.....	9	12		Gibson.....	30		
Indianapolis.....	6			Gove f.....	8		
Jeffersonville.....	6			Grenola.....	9		
Kokomo.....	10			Horton.....	30		
Lafayette.....	6			Hutchinson.....	8		
Madison.....	10			Independence.....	8		
Marengo.....	6			Ionia.....	1		
Marion.....	6	4		Jaqua.....	4		
Mauzy.....	6			Johnson.....	8		
New Albany.....	10			Kiowa.....	8		
Plymouth.....	10			Lakin.....	28		
Princeton f.....	10			Lebo.....	6		
Rockville f.....	6			Mackaville f.....	8		
Scottsburg.....	6			Marion.....	8		
Shelbyville f.....	9			Morton.....	8		
South Bend.....	14			Mount Hope.....	8		
Terre Haute.....	6			Ness City f.....	30		
Vevay.....	14			Olathe.....	8		
Worthington.....	6			Oswego.....	8		
<i>Indian Territory.</i>				Rome.....	8		
Eufaula.....	9	29		Sedan.....	5		
Kemp.....	49			Topeka.....	8		
Lephigh.....	8	30		Tribune f.....	3		
Purcell.....	9	30		Ulysses.....	3		
Tahlequah.....	3	30		Wakefield.....	8		
<i>Iowa.</i>				Wamego.....	8		
Afton f.....	8	29		Washington.....	8		
Alta.....	29			Wellington.....	30		
Amasa.....	6			Wichita.....	8		
Atlantic (near).....	28			Winfield.....	8		
Atlantic.....	28			Yates Center.....	8		
Belle Plaine.....	9			<i>Kentucky.</i>			
Bonaparte f.....	9			Alpha.....	5		
Carroll.....	8			Blandville.....	5		
Cedar Rapids.....	5			Bowling Green.....	5		
Charles City.....	6			Caddo.....	15		
Clinton.....	29	29		Canton.....	14		
College Springs.....	6			Carrollton f.....	9		
Corning.....	29			Cattlettsburg.....	6		
Davenport.....	6	29		Earlington.....	14		
Des Moines.....	14	30		Edmonton f.....	10		
Emmetsburg.....	6	29		Eubank.....	5		
Fairfield.....	9			Fords Ferry.....	9		
Forest City f.....	6			Franklin f.....	25		
Fort Madison.....	9			Georgetown f.....	9		
Glenwood f.....	8	29		Greendale.....	15		
Grand Meadow.....	1	30		Greensburg f.....	9		
Greenfield.....	4	29		Harrodsburg.....	6		
Hoperville f.....	8	29		Louisville.....	9		
Hopkinton.....	14			Marrowbone.....	9		
Humboldt.....	3			Matlock.....	5		
Independence.....	6			Mount Sterling f.....	6		
Indianola f.....	14			Munfordville f.....	15		
Keokuk.....	9			Paducah.....	9		
Keosauqua.....	9			Pellville f.....	9		
Knoxville f.....	14			Princeton.....	7		
Larrabee.....	29			Russellville.....	9		
Logan f.....	8	29		Shelby City.....	5		
Maxon.....	9			Shelbyville.....	31		
Mechanicsville f.....	8			Springfield.....	5		
Mount Pleasant.....	8			Williamsburg.....	9		
Newton f.....	9						

## Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<i>Louisiana.</i>				<i>Michigan—Cont'd.</i>			
Abbeville.....	9			Ovid.....	15		
Alexandria.....	9			Parkville.....	1		
Amite.....	31			Pontiac f.....	2		
Baton Rouge.....	30			Port Huron.....	1		
Cameron.....	29			Rockland.....	13		
Cheneyville.....	15			St. Johns.....	14		
Clinton.....	15			Sand Beach.....	14		
Coushatta.....	30			Sault Ste. Marie.....	14		
Covington.....	14	30		Stanton.....	14		
Delhi.....	9	30		Vandalia.....	14		
Farmerville.....	9	30		<i>Minnesota.</i>			
Franklin.....	30			Beardsley.....	7		
Houma.....	30			Belle Plaine f.....	3		
Jeanerette.....	9	30		Bird Island.....	7		
Lafayette.....	15			Blooming Prairie.....	3		
Lake Providence.....	9			Bonniwells Mills.....	30		
Lawrence.....	30			Cambridge.....	30		
Liberty Hill.....	9	39		Camden.....	29		
Melville.....	15	39		Campbell.....	7		
Monroe.....	9	39		Clearwater.....	31		
Natchitoches.....	9			Collegeville.....	39		
New Iberia.....	14			Crookston.....	7		
Opelousas.....	15			Duluth.....	10		
Oxford.....	9	30		Farmington.....	7		
Paincourtville.....	9			Fergus Falls.....	7		
Plain Dealing f.....	9	30		Fort Ripley.....	7		
Rayne.....	30			Granite Falls.....	7		
Shell Beach.....	30			Lake Winnibigosis f.....	13		
Shreveport.....	9			Leech Lake.....	7		
Sugartown f.....	29	30		Luverne.....	29		
Wallace.....	31			Maple Plain.....	7		
<i>Maine.</i>				Minneapolis.....	1	29	
Eastport.....	16			Montevideo.....	7		
Gardiner.....	15			Moorhead.....	7		
Madison f.....	19			Morris.....	7		
Mayfield.....	8	15		New Ulm.....	30		
North Bridgeton.....	16			Ortonville.....	7		
West Jonesport f.....	13			Park Rapids.....	7		
<i>Maryland.</i>				Pokegama Falls.....	7		
Bachmans Valley.....	12			Red Lake.....	29		
Baltimore.....	12			Rolling Green.....	30		
Boetherville.....	12			St. Cloud.....	30		
Charlotte Hall.....	14	15		St. Olaf.....	7		
College Park.....	12			St. Vincent.....	7		
Darlington.....	12			Sandy Lake Dam.....	30		
Easton.....	11			Sauk Center.....	29		
Fallston.....	12	15		Two Harbors.....	29		
Frederick.....	2			Willmar.....	7		
La Plata f.....	14			Winona.....	9		
Mardela Springs.....	12	15		Worthington.....	3		
Mt. St. Marys College.....	12	15		<i>Mississippi.</i>			
Oakland.....	14			Aberdeen.....	10	15	
Pocomoke City.....	12	17		Agricultural College.....	6		
Solomons.....	7			Batesville f.....	9	31	
Sunnyside.....	7	14		Briers.....	15		
Taneytown.....	7			Canton.....	9		
Woodstock.....	7	16		Columbus.....	10		
<i>Massachusetts.</i>				Crystal Springs.....	9		
Andover f.....	16			Duck Hill.....	8		
Boston.....	16			Edwards.....	9		
Brookton f.....	16			Egypt.....	11	14	
Chestnut Hill f.....	16			Enterprise.....	14	30	
Fall River.....	12			Fayette.....	13		
Fitchburg.....	16			French Camps.....	9		
Long Plain f.....	19			Greenville.....	9		
Lowell f.....	16			Hattiesburg.....	10		
Ludlow Center.....	12	19		Holly Springs.....	9		
Mansfield.....	15			Jackson f.....	31		
Middleboro.....	15	16		Logtown.....	31		
Milton.....	12			Louisville f.....	10	31	
Monroe.....	14			Macon f.....	31		
New Bedford.....	19			Meridian.....	10		
Somerset.....	19			Palo Alto.....	9	15	
Taunton.....	7			Stonington.....	9		
Vineyard Haven.....	15			Topton.....	10		
Wakefield.....	19			Valden f.....	6	31	
Westboro.....	19			Vicksburg.....	9		
Worcester.....	12			Water Valley.....	9		
<i>Michigan.</i>				Waynesboro.....	9	31	
Allegan f.....	1			Woodville.....	9		
Bail Mountain.....	1			Yasoo City.....	9		
Berlin.....	14			<i>Missouri.</i>			
Birmingham f.....	13			Akron.....	8	29	
Boon.....	9	8		Appleton City.....	8		
Calumet.....	14			Arthur.....	7		
Charlevoix f.....	14			Bethany f.....	9		
Detroit.....	14			Birch Tree.....	9		
Fairview f.....	14	13		Bluffton.....	8		
Grand Haven.....	15			Brunswick.....	8		
Grand Rapids.....	14			Carthage.....	8		
Grape.....	14			Carrollton.....	8		
Grayling.....	11			Columbia.....	5	8	
Hart.....	15			Conception f.....	9	29	
Hesperia.....	12			Cowling.....	8		
Jeddo.....	14			Darksville f.....	8		
Kalamazoo.....	14			Downing.....	7		
Lodi.....	14	14		East Lynne f.....	31		
Marquette.....	8			Eldon.....	4		
Mayville.....	14			Elmira.....	9	29	
Mottville.....	10	14		Fairport.....	30		
Northport.....	14			Farmersville.....	9		
Old Mission.....	15			Fayette.....	5	9	



Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<b>Missouri—Cont'd.</b>				<b>Nebraska—Cont'd.</b>			
Fox Creek †	8	9		State Farm		29	
Fulton	19			Superior †	8		
Gallatin		31		Sutton	28		
Gayoso		9		Turlington	8		
Glasgow	13	14		Valentine	28		
Glenated		9		Weeping Water	31		
Gordonville		9		<b>Nevada.</b>			
Gorin	7	9		Battle Mountain	28		
Greenville	9	14		Belleville †	1		
Grove Dale		8	30	Downeyville †	1		
Half Way	5	8	29	Hot Springs †	28		
Hannibal		8		Oseola †	1		
Harrisonville		6		Paradise	20		
Houston	1	9		<b>New Hampshire.</b>			
Houstonia (near)		8		Berlin Mills		15	
Ironton		9		Bethlehem		15	
Kansas City		5		Brookline	7		
Kidder		8		Dublin	12		
Lamar		3		Littleton	13		
Lamonte	5	8		Stratford	15		
La Plata		8		West Milan	15		
Lebanon		9		<b>New Jersey.</b>			
Liberty		9	29	Allaire	7	12	
Linn Creek		9		Asbury Park		15	
McCune	9	11		Atlantic City	12		
Marceline	3	31		Bayonne	12	15	
Marshall †		8		Belvidere †		16	
Maryville		9	29	Beverly	12	16	
Mexico		8		Blairstown †		16	
Miami		8		Bridgeton	2		
Mine La Motte	8	9		Camden	12		
Mount Vernon		8		Cape May	15		
Nevada		8		Cape May C. H.		12	
New Hartford		9		Chester	12	15	
Oakfield	5	9		Dover	7		
Olden		8		Egg Harbor City	12		
Oregon		8	30	Elizabeth		16	
Palmyra		9		Franklin Furnace †		19	
Panacea	5	8		Franklinville	3	12	
Pickering		29		Freehold		17	
Platte River		8	29	Friesburg	7		
Poplar Bluff		9		Gillette	11	20	
Potosi		9		Hightstown	12		
Princeton		8		Imlaystown	7		
St. Charles		9		Junction		16	
St. Louis	9			Millville		12	
Sarcozie		8		Moorestown	12		
Sedalia †		31		Newark	12		
Springfield		8		Ocean City	15		
Steffenville		6		Oceanic	15		
Stellada		8		Pensauken	7		
Sublett		8		Plainfield	7	16	
Tindall		7		Rancocas	6		14
Unionville	7	8	29	River Vale †		8	
Warrensburg	5	8		Somerville		12	
Warrenton		9		South Orange		16	
Wheatland		8		Tenady	11	16	
<b>Montana.</b>				Toms River		16	14
Billings		6		Trenton	2		
Bozeman		26		Vineland	6	12	
Cascade		5		Woodbine †		11	
Cokedale		6		<b>New Mexico.</b>			
Fort Custer		1		Albert †		29	
Fort Keogh		1		Albuquerque		29	
Fort Missoula		27		Alma		28	
Glendive		3		Eddy	29		
Martinsdale		24		Fort Bayard †		29	
Mingusville		2		Fort Stanton †		23	
<b>Nebraska.</b>				Gallisteo †		29	
Agoo		7		Gallinas Spring		8	
Ansel		28		Halls Peak		27	
Arberville †		8		Los Lunas †		20	
Ashland		29		Monero		1	
Basett		7		Rincon		31	
Beaver City		8		Roswell	7	29	
Bratton		7	29	San Marcial		29	
Burwell †		30		Santa Fe		2	
Cortland		6		<b>New York.</b>			
Crete †		8		Addison		14	
Culbertson		28		Albany		15	
David City		29		Alfred Center		13	
Fort Robinson		28		Angelica		14	
Genova		28		Arcade		14	
Haigler		27		Bedford		16	
Hartington		29		Binghamton		14	
Harvard		10		Brookfield		14	
Imperial †		7		Buffalo		15	14
Kennedy		28		Canton		14	
Kimball		28		Cooperstown		16	
Madrid		27		Fleming †		15	
Marquette		8		Fort Niagara †		29	
Minden		28		Friendship		11	
Mullen †		6	26	Gloversville		14	
Nebraska City		8		Hess Road Station		14	
Norfolk †		8		Honeymead Brook †		16	
North Platte		29		Humphrey		13	
Omaha		8		Ithaca		14	
Ough		30		Lebanon Springs		14	
Palmer		30		Le Roy		14	
Plattsmouth		29		Lockport		14	
Reward		28		Lowville		14	
Springview		3		Malone		14	

Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<b>New York—Cont'd.</b>				<b>Ohio—Cont'd.</b>			
Massena			24	Cincinnati	6	10	
Minnewaska †		15		Clarksville		10	
New Lisbon		14		Cleveland	7	15	14
New York	12			Coalton		6	
North Hammond		14		Colebrook			14
Oswego		15		Columbus	7	15	
Perry City		14		Cynthiana		6	
Poughkeepsie †		7		Dayton		10	
Rochester		14		Demos		15	
Saranac Lake		15		Ellsworth		15	
South Canisteo		14		Findlay		14	
South Kortright		14		Fostoria †		14	
Stillwater †		19		Frankfort		7	
Turin		14		Garrettsville		14	
Varysburg		14		Georgetown †		15	
Watertown		14		Granville		15	
Waverly		14		Gratiot		12	
<b>North Carolina.</b>				Greenfield †		15	
Asheville †		12		Green Hill		12	14
Auburn	12			Greenville †		15	
Bailey		15		Guyville †		15	
Bakersville		6		Hackney †		8	
Blowing Rock †		14		Hanging Rock †		9	
Bryson City		10		Hillhouse		15	
Chapel Hill		15		Hillsboro		6	
Charlotte		15		Hiram		15	14
Fair Bluff		16		Jacksonboro		14	
Fayetteville		15		Killbuck †		15	
Flat Rock	5	14		Logan		15	
Henderson		9		Lowell		8	
Highlands		6	12	McConnellsville		15	
Horse Cove	12	14		Marietta †		14	
Kittyhawk		16		Marion		14	5
Lenoir	6	12		Milford †		7	
Lilesville		15		Napoleon		15	
Littleton		14		New Berlin		12	
Louisburg		15		New Comerstown		15	
Lynn	31			New Waterford		12	
Mocksville	6	15		North Lewisburg		7	
Moncure		15		North Royalton †		15	
Morganton †		15		Northwood		10	
Mount Airy	6	12		Norwalk		15	
Mount Pleasant †		12	15	Ohio State University		15	
Murphy		6	14	Orangeville		7	
Oak Ridge		12	15	Pataskala		12	
Pantego		15		Pomeroy †		9	
Pittsboro		15		Portsmouth		12	
Raleigh		15		Richwood			13
Rockingham		12		Ridge		9	
Roxboro †		12	15	Ripley		9	
Salisbury		12	15	Rittman		15	
Saxon		14		Rosewood		1	
Selma		15		Sandusky		15	
Sloan		15		Shenandoah †		14	
Soapstone M. †		12	15	Swanton			4
Tarboro		15		Thurman †		5	
Waynesville	5	6		Tiffin		1	13
Weldon		15		Toledo		15	
Willeyton		15		Upper Sandusky		1	
<b>North Dakota.</b>				Vanceburg		15	
Berlin			1	Van Wert		14	13
Bismarck			2	Vermillion		15	
Bottineau			2	Vickery		14	
Dickinson			1	Warren			14
Ellendale			7	Warsaw		12	
Fargo			7	Waverly		6	
Fort Yates			7	Waynesville		10	
Gallatin			7	Westerville		15	
Jamestown			7	Weymouth		11	
Kelso			7	Wheeler		18	
Larimore			6	Wooster		7	
McKinney			2	Youngstown †		7	14
Milton			3	<b>Oklahoma.</b>			
Napoleon			7	Alva		8	
New Salem			7	Anadarko †		31	
Portal			2	Arapaho		8	
University			28	Burnett		9	
Wahpeton			7	Clifton		8	
Wild Rice			7	Fort Sill †		30	
Williston			2	Fort Supply		7	
<b>Ohio.</b>				Guthrie		8	
Akron †		15		Mangum		30	
Annapolis †		7		Oklahoma		8	
Arcanum		10		Pond Creek		8	
Athens		7		Stillwater		8	
Atwater		7		Winnview		8	
Bangorville		7	31	<b>Oregon.</b>			
Bellefontaine		10		Arlington †		7	
Bethany †		6		Ashland		6	
Binola		15		Aurora		6	
Biasela		15	14	Baker City		6	
Bladensburg		14		Bandon		6	
Bloomington		10		Burns			19
Bowling Green		14		Canyon City		37	
Bucyrus †		14		Cornelius		5	
Cambridge		9		Corvallis		11	
Camp Dennison		15		Crook			19
Cardington		12		Detroit		7	26
Carrollton †		9		Forest Grove		6	
Cedarville		15		Glenora		9	18
Celina		15		Grants Pass †		6	
Cherry Fork		9		Heppner		7	



Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
<i>Oregon—Cont'd.</i>				<i>South Carolina—Cont'd.</i>			
Hood River (near).....		9		Georgetown.....	15		
Hubbard.....		17		Greenville.....	12		
La Grande.....		6		Greenwood.....	15		
Pendleton.....		7		Hardeeville.....	15		
Portland.....	19			Hollands Store.....	15		
Roseburg.....	6			Little Mountain.....	12		
Salem.....	11			Longshore.....	12	15	
Sparta.....	6			McCormick.....	15		
The Dalles.....	7			Pinopolis.....	16		
<i>Pennsylvania.</i>				Shaws Fork.....	12	15	
Aqueduct.....		12		Society Hill.....	15		
Blooming Grove.....		14		Statesburg.....	15		
Carlisle.....		12		Trenton.....	15		
Cassandra.....		14		Trials.....	15		
Chambersburg.....		12		Watts.....	15		
Clarion.....		14		Yorkville.....	14		
Cotestown.....		12		<i>South Dakota.</i>			
Du Bois.....		15		Alexandria.....		7	
Dyberry.....		14		Ashcroft.....		6	
Easton.....	7			Bowdle.....		7	
Edinboro.....		15		Clark.....		7	
Emporium.....		14		Flandreau.....		3	
Grampian.....		7	14	Fort Meade.....		7	
Greenville.....		7	13	Fort Sully.....		7	
Hamburg.....		16		Frankfort.....			
Harrisburg.....		14		Gary.....		5	
Holidaysburg.....		14		Higmore.....		3	
Huntingdon.....		12		Hitch City.....		3	
Johnstown.....		11	13	Huron.....		3	
Kennett Square.....	7	15		Kimball.....		7	
Kilmer.....		8	14	Millbank.....		7	
Lancaster.....		16		Northville.....		7	
Lebanon.....		12		Oelrichs.....		28	
Le Roy.....			14	Piedmont.....		27	
Lewisburg.....		16		Pierre.....		7	
Lyeippus.....		15		Rapid City.....		2	
Oil City.....			14	Rosebud.....		7	
Parker.....			14	Sioux Falls.....		29	
Philadelphia.....	12			Spearfish.....		7	
Phoenixville.....		15		<i>Tennessee.</i>			
Pittsburg.....		7	14	Andersonville.....	6		
Pottstown.....	12	16		Ashwood.....		10	
Quakertown.....		14		Byrdstown.....	6	14	
Ridgway.....		14		Chattanooga.....	6	15	
Saegertown.....		14		Clarksburg.....	5	10	
Shinglehouse.....		14		Covington.....	9		
Smethport.....		14		Florence Station.....	5	9	
Somerset.....		6		Franklin.....	5	10	
South Eaton.....		16		Greeneville.....	11	14	
State College.....		14		Hohenwald.....	5	9	
Towanda.....		14		Jackboro.....	6	15	
Uniontown.....	12			Johnson City.....	5	15	
Westtown.....	12			Knoxville.....	6	15	
York.....	7	14		Lynnville.....	9	16	
<i>Rhode Island.</i>				Memphis.....	6	10	
Bristol.....	19			Milan.....	6	10	
Kingston.....		16		Nashville.....	6	15	
Narragansett Pier.....	15			Newport.....	11	15	
Providence.....	12	16		Nunnally.....	10	9	
<i>South Carolina.</i>				Riddleton.....	10	14	
Aiken.....	15			Rogersville.....	11	14	
Blackville.....	15			Rugby.....	5	6	
Blenheim.....	15			Springdale.....	5	11	
Branchville.....	15			Tallahassee.....	4	10	
Camden.....	15			Waynesboro.....		9	
Central.....		15		<i>Texas.</i>			
Cheraw.....	15			Arlington.....	30		
Columbia.....	15			Arthur City.....	7		
Conway.....	15			Aurora.....	30		
Cross Hill.....	15			Brady.....	30		
Efingham.....	14			Brasoria.....	30		

Dates of first light and heavy frosts and snow—Continued.

State and station.	First frost.			State and station.	First frost.		
	Light.	Heavy.	Snow.		Light.	Heavy.	Snow.
Texas—Cont'd.				Washington—Cont'd.			
College Station.....	30			East Clallam.....		17	
Columbia.....	30			Everett.....		21	
Corsicana.....	31			Fort Simcoe.....		18	
Dallas.....	31			Kennewick.....		9	
Devine.....	30			Lakeside.....		18	
El Paso.....		30		Lapush.....		12	
Estelle.....		30		Madrona.....	19		
Fort Hancock.....		21		Olga.....	18		
Fort Stockton.....	29			Pine Hill.....	6		
Grape Vine.....	9			Pullman.....		30	
Hale Center.....		29		Pysht.....	7	18	
Hallettsville.....	30			Tacoma.....		18	
Happy.....		8		Union City.....		21	
Houston.....	30			Walla Walla.....	7	20	
Jefferson.....	27	30		Waterville.....			23
Leakey.....		29		West Ferndale.....	6	12	
Menardville.....		29		West Virginia.			
Midland.....		29		Beverly.....		15	14
Mountain Spring.....	9			Bloomery.....		12	
New Braunfels.....	30			Buckhannon.....			31
Palestine.....	30			Creston.....		10	
Roby.....		30		Davis.....			14
Round Rock.....	30			Elkhorn.....	6	15	
Utah.				Ella.....		15	
Cisco.....		2		Glenville.....		12	
Loa.....			31	Grafton.....		15	
Manti.....		13		Huntington.....		8	
Moab.....		8		Madison.....	9	10	
Mount Pleasant.....		28		Martinsburg.....	12	13	
Ogden.....		28		Morgantown.....		9	
St. George.....		1		New Cumberland.....		15	
Salt Lake City.....			27	New Martinsville.....		9	
Soldier Summit.....			26	Nuttallburg.....		5	
Vermont.				Parkersburg.....		15	
Brattleboro.....		19		Point Pleasant.....		9	
Burlington.....		14		Powellton.....		14	
Enosburg Falls.....		15		Sandyville.....		9	31
St. Johnsbury.....		15		Tannery.....		12	
Stratford.....		15		Wheeling.....		15	
Vernon.....		12		Wisconsin.			
Woodstock.....			16	Bellefonte.....			4
Virginia.				Beloit.....		14	
Ashland.....		12		Black River Falls.....		9	
Bedford City.....	12			Chilton.....		9	
Big Stone Gap.....	5	10	31	Depere.....		11	
Birdsnest.....		16		Green Bay.....		13	
Blacksburg.....	6	12		Koepenick.....		8	17
Buckingham.....		15		La Crosse.....		9	
Dale Enterprise.....	7	15		Lancaster.....		14	
Hot Springs.....		6	31	Madison.....		9	
Irwin.....		15		Manitowoc.....		14	
Lexington.....		15		Medford.....			7
Lynchburg.....	12	15		New Holstein.....		6	
Norfolk.....		16		Oconomowoc.....			17
Nottoway.....		15		Osceola.....			30
Petersburg.....		16		Oshkosh.....		9	
Richmond.....	15			Pepin.....		13	
Rocky Mount.....		15		Port Washington.....		8	
Salem.....	15			Sharon.....			17
Smithville.....	15			Waukesha.....		14	
Spottsville.....		15		Wyoming.			
Stanardsville.....		15		Big Horn Ranch.....			6
Stanton.....		12		Camp Pilot Butte.....			26
Stephens City.....		15		Cheyenne.....			26
Warsaw.....	12			Fort McKinney.....			26
Whittles Depot.....		15		Laramie.....			29
Wytheville.....		11		Lusk.....			27
Washington.				Saratoga.....			27
Blaine.....		6		Sheridan.....			27
Bridgeport.....		10		Sundance.....			2
Chehalis.....		18					

## HUMIDITY.

The quantity of moisture in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air. This is usually known as the absolute measure and is equivalent to giving the tension of the vapor, the vapor pressure, or the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I. These vapor tensions and the resulting dew-points, absolute humidities, and relative humidities are all deduced from observations of the wet-bulb thermometer by means of formulæ and tables that were first devised by August and subsequently modified by Regnault, 1845, and Ferrel in 1885, but which are still considered to be open to further im-

provement. In a general way the dew-points given in Table I are probably slightly lower than they should be, owing to the omission since 1887 of a correction for barometric pressure. There is also an uncertainty in the psychrometric formula which is only just now beginning to be understood, by virtue of which at temperatures below freezing the dew-points and the humidities are higher than they should be. For these reasons the monthly averages of the dew-points and relative humidities are subject to some uncertainty.

## AVERAGE HUMIDITY.

The temperature of the wet bulb of the psychrometer is the temperature at which evaporation is going on from a special



surface of water on muslin at any moment, but a properly constructed evaporimeter may be made to give us the *quantity of water evaporated* from a *similar surface* during any interval of time. Such an evaporimeter, therefore, would sum up or integrate the effect of those influences that determine the temperature as given by the wet bulb, and from it, therefore, the average humidity of the air during any given interval of time may be deduced. Instead of attempting to make a self-registering wet-bulb thermometer we may use the evaporimeter as an equivalent. The formula for determining the average vapor tension during an hour was given in 1887, at page 376 of the *Treatise on Meteorological Apparatus and Methods* (in the section on the use of the evaporimeter as an integrating hygrometer), as based on the careful measurements made by Mr. Desmond Fitzgerald and published in the *Transactions of the American Society of Civil Engineers*, 1886. Let  $p$  be the average vapor tension in the free air,  $P$  the vapor tension corresponding to the temperature of the evaporating water (both of these tensions are to be expressed in inches of the mercurial barometer, and as the evaporimeter was within the ordinary thermometer shelter, therefore, the temperature of the water corresponded closely with the temperature of the air and the vapor tension  $P$  was that for the average temperature of the air during the interval of observed evaporation);  $W$  the velocity of the wind in miles per hour as measured by the Robinson anemometer at the level of the surface of the evaporating water;  $E$  the observed depth of water evaporated in an hour and expressed in inches. With this notation the approximate formula that represents Mr. Fitzgerald's observations reads:

$$p = P - \frac{60E}{1 + \frac{1}{2}W} = P - 60 \frac{E}{W} \cdot \frac{1}{\frac{1}{2}W + 0.5}$$

An additional factor depending on the atmospheric pressure should probably be introduced, but would only become important at elevated stations.

It is much to be desired that one or more new series of accurate measurements of evaporation, wind velocity, temperature, and dew-point be made at high and low stations in instrument shelters similar to those used by the Weather Bureau, in order that a general empirical formula may be devised for use with the evaporimeter considered as an integrating hygrometer.

#### WET-BULB OR SENSIBLE TEMPERATURES.

The sensation of heat experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but especially upon its dryness and the force of the wind. Physiologists have explained this nervous sensation, erroneously called subjective temperature, as a condition due to the more or less rapid evaporation of the natural perspiration and the consequent drying of the outer layers of the skin.

Investigations were made into the relations between the moisture of the air and its physiological effects by Mr. J. W. Osborne, of Washington (see the *Proceedings of the American Association for the Advancement of Science*, 1876), and especially by the Chief of the Weather Bureau (see his memoir on "Sensible Temperatures," read before the American Climatological Association, June 1, 1894). It would seem that the rapid evaporation from the skin in dry, hot weather reduces the temperature of the layer of nerve cells at the surface of the skin. This reduction is not measurable by thermometers which give the temperature of large masses, but is appreciated by the minute nerves that end in these microscopic cells. This reduction of temperature, or sensible coolness, is apparently proportional to the reduction of temperature shown by the difference between the dry and wet bulb thermometers, and as shown by the chart accompanying Professor Harrington's memoir, it amounts on the average to 20° in the month of July in Arizona, Nevada, and Utah and 10° in Kentucky, Indiana, and Ohio.

The resulting sensible temperatures, as shown on his second chart, are simply the so-called average temperatures of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter, and correspond to the surface or skin temperatures of persons standing in the shade of trees or houses exposed to a natural breeze of at least 6 miles per hour. The temperature of the wet-bulb thermometer and its depression below the dry bulb are the fundamental data for all investigations into the relation between human physiology and the atmosphere. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table Ia has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

#### PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation for the month of October, 1894, as determined by reports from about 2,000 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III; the first of these also gives the average departures from the normal for each district, whereas the average departure for each State is given in Table XII for each State Weather Service.

##### DIURNAL VARIATION.

Table IVb gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 27 are float gauges and 6 are weighing gauges.

##### NORMAL PRECIPITATION FOR OCTOBER.

The normal precipitation for October is shown on Chart IX of the *Atlas of Bulletin C*, entitled "Rainfall and Snow of the United States, Compiled to the End of 1891, with Annual, Seasonal, Monthly, and other Charts," by Mark W. Harrington, Chief of the Weather Bureau, Washington, 1894. From this chart it appears that the region of greatest rain-

fall in October is over 9 inches in the extreme northwest corner of Washington; the next largest rainfalls are over 6 inches in the southeastern end of Florida and the neighborhood of Cape Hatteras. The region of 3 inches, or over, covers the western quarter of Washington and Oregon and nearly all of the Atlantic and Gulf coasts, extending inland to a distance that varies from 100 miles in southern Texas to 300 miles in New England.

##### PRECIPITATION FOR CURRENT MONTH.

The precipitation for the current October was heaviest on the coasts of Washington and Oregon, where it ranged from 9 to 17 inches. Heavy precipitation, viz, above 8 inches, occurred at Narragansett Pier, Vineyard Haven, Woods Holl, and Nantucket. The precipitation averaged 1 inch, or less, in Mississippi, Tennessee, Illinois, and westward from the Mississippi River to the Rocky Mountains, and in southern California.

##### CURRENT DEPARTURES FROM NORMAL PRECIPITATION.

The precipitation for October was in excess on the coast of



Washington, along the Atlantic coast from Maine to North Carolina, and in the extreme northern portion of the United States from Maine to Idaho. There was a deficiency, with few exceptions, from the Gulf States to the fortieth parallel of latitude.

The principal departures from the normal at Weather Bureau stations were as follows:

*Excesses.*—Vineyard Haven, 6.6; Astoria, 6.1; Nantucket, 5.0; Fort Canby, 4.7; Neah Bay, 3.7; Tatoosh Island, 3.5; St. Paul, 2.6; New York, 2.4; Duluth, 2.2.

*Deficits.*—Galveston, 4.4; Corpus Christi, 3.2; Palestine, 2.8; Springfield, Ill., Chicago, and Memphis, 2.6; New Orleans, 2.5; Jacksonville, 2.4; Nashville and Kansas City, 2.2; Titusville, 2.1; Springfield, Mo., 2.0.

Considered by districts, the precipitation for October, 1894, when compared with the normal for the month, furnishes the departures given in Table I, as expressed in inches. By dividing those departures by the normal precipitation for October we obtain the following corresponding percentages (precipitation is in excess when the percentage of the normal exceeds 100):

Above the normal: New England, 156; middle Atlantic, 136; south Atlantic, 112; Key West, 130; lower Lake, 112; North Dakota (extreme northwest), 125; northern plateau, 105; north Pacific, 146; middle Pacific, 106.

Below the normal: east Gulf, 84; west Gulf, 45; Ohio Valley and Tennessee, 49; upper Lake, 91; upper Mississippi, 62; Missouri Valley, 77; northern slope, 88; middle slope, 67; southern slope (Abilene), 38; southern plateau, 87; middle plateau, 76; southern Pacific, 21.

For certain voluntary stations of rather long periods of observation the normal and extreme monthly precipitations and the departures are shown in detail in Table X b, which is now placed among the meteorological tables instead of being inserted in the text as heretofore.

#### YEARS OF GREATEST PRECIPITATION FOR OCTOBER.

The precipitation for the current month was the greatest on record for the month of October at regular Weather Bureau stations, as shown in the following table:

Station.	Current precipitation.		Previous maximum.	
	Amount.	Departure.	Amount.	Year.
Fort Canby, Wash .....	10.12	+4.7	8.08	1889
Astoria, Oreg .....	12.19	+6.1	9.64	1889
Havre, Mont .....	1.73	+1.2	1.47	1890
Duluth, Minn .....	4.99	+2.2	4.92	1877
St. Paul, Minn .....	4.49	+2.6	4.44	1881
Nantucket, Mass .....	10.05	+5.0	6.72	1890
Vineyard Haven, Mass .....	10.88	+6.6	7.57	1891

#### YEARS OF LEAST PRECIPITATION FOR OCTOBER.

The precipitation for the current month was the least on record for the month of October at regular Weather Bureau stations, as shown in the following table:

Station.	Current precipitation.		Previous minimum.	
	Amount.	Departure.	Amount.	Year.
Lander, Wyo .....	0.03	-1.1	0.88	1888
Rapid City, S. Dak .....	0.10	-0.4	0.34	1891
Memphis, Tenn .....	0.55	-2.6	0.59	1886

#### ACCUMULATED PRECIPITATION.

The total accumulated monthly departures from normal precipitation from the beginning of the year to the end of the current month are given in the second column of the fol-

lowing table; the third column gives the ratio of the current accumulated precipitation to its normal value:

District.	Accumulated departure.	Accumulated precipitation.	District.	Accumulated departure.	Accumulated precipitation.
	Inch.	Per ct.		Inch.	Per ct.
New England .....	8.60	78	Key West .....	5.20	114
Middle Atlantic .....	4.20	89	Middle slope .....	0.90	105
South Atlantic .....	1.80	94	Middle plateau .....	1.00	110
East Gulf .....	4.70	90	Northern plateau .....	2.90	119
West Gulf .....	2.00	95	North Pacific .....	14.30	133
Ohio Valley and Tennessee .....	8.90	78			
Lower Lake .....	3.60	88			
Upper Lake .....	1.40	95			
North Dakota (Ex. NW.) .....	0.10	99			
Upper Mississippi .....	10.80	66			
Missouri Valley .....	7.64	74			
Northern slope .....	1.00	92			
Southern slope (Abilene) .....	0.20	99			
Southern plateau .....	3.60	64			
Middle Pacific .....	1.20	94			
South Pacific .....	4.70	51			

#### EXCESSIVE PRECIPITATION.

The following table for October, 1894, shows, by States, the individual stations reporting total precipitation to equal or exceed 10.00 inches during this month, 2.50 in 24 hours, and 1.00 in 1 hour:

#### Excessive precipitation, by stations, for October, 1894.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall 1 inch, or more, in one hour.	
		Amt.	Day.	Amt.	Time.
<b>Alabama.</b>	Inches.	Inches.		Inches.	A. M.
Bermuda .....	2.80	8			
Claiborne Landing .....	3.20	7-8			
Daphne .....	5.37	7-8			
Eufaula .....	3.15	7-8			
Evergreen .....	4.79	7-8			
Fort Deposit .....	4.40	7-8			
Highland Home .....	3.85	8-9	1.95	1.45	4
Mobile .....	3.39	7-8			
Mount Willing .....	3.50	8			
Newton .....	5.31	7-8			
Union Springs .....	5.05	8-9			
<b>Arizona.</b>					
Farley's Camp .....			1.25	1.00	26
<b>Arkansas.</b>					
Lonoke .....			1.25	1.00	2
New Gascony .....			1.10	1.00	2
Pine Bluff .....			1.00	0.35	2
<b>California.</b>					
La Porte .....	3.17	20			
<b>Connecticut.</b>					
Canton .....	2.73	10			
Hartford .....	2.63	10			
Middletown .....	2.50	10			
Do .....	2.95	24-25			
New London .....	2.50	24-25			
Norwalk .....	2.50	24-25			
West Simsbury .....	2.78	10			
<b>Florida.</b>					
Jacksonville .....	2.63	6-7	1.82	1.00	6
Jupiter .....			1.31	1.15	12
Key West .....	3.49	4-5	1.85	0.33	4
Do .....			1.10	1.02	11
Lake .....	2.84	8-9			
Moseley Hall .....	4.65	8-9			
Do .....	2.53	29-30			
New Smyrna .....			1.18	0.45	13
Orange Park .....	3.00	6			
Orlando .....	2.63	13			
Pensacola .....	2.53	7-8			
Tampa .....			1.51	0.40	8
<b>Georgia.</b>					
Alapaha .....	5.14	8-9			
Albany .....	3.73	9			
Americus .....	3.05	8-9			
Athens .....	3.12	8-9			
Augusta .....	2.80	8-9			
Bainbridge .....	5.60	8-9			
Blakeley .....	5.80	8			
Bragg .....	3.05	8-9			
Camak .....	3.00	8-9			
Columbus .....	5.12	7-8			
Dublin .....	3.50	8			
Dublin .....	3.15	8			
Elberton .....	4.00	7-8			
Forryth .....	3.14	8-9			
Fort Gaines .....	4.42	9	4.42	4.00	9
Hawkinsville .....	3.20	9			
Hephzibah .....	3.70	8			
Louisville .....	3.03	9			



## Excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Georgia—Cont'd.		Inches.	Inches.	Inches	A. M.	
Marshallville		3.40	8			
Millen		4.55	9			
Monticello		3.40	9			
Morgan		4.48	8			
Piscola		5.00	8-9			
Point Peter		3.80	8-9			
Poulan		4.24	8-9			
Quitman		3.30	9			
Reynolds		4.20	9			
Talbotton		5.67	9-10			
Thomasville		3.08	8-9			
Washington		3.25	8-9			
Waynesboro		4.82	8			
Indian Territory.						
Lehigh		2.77	2			
Iowa.						
Ames b		3.46	20-21	2.17	1 00	20
Ames c		3.23	20			
Atlantic		2.77	1			
Kansas.						
Atchison		2.82	18-19			
Wakefield		2.78	1	1.85	1 00	1
Kentucky.						
Cromwell				1.42	1 00	12
Maryland.						
Darlington		2.50	9			
Pocomoke City		2.60	9-10			
Woodstock		2.65	9-10			
Massachusetts.						
Brockton c		2.63	25-26			
Hyannis		2.90	25-26			
Leeds		2.80	10			
Long Plain		2.82	25-26			
Mansfield		2.50	25-26			
Middleboro		3.46	25-26			
Nantucket		10.05	2.77	4-5		
Do		3.40	25-26			
New Bedford a		2.62	25-26			
New Bedford b		3.70	25-26			
Somerset		3.35	25-26			
Vineyard Haven		10.88	5.46	25-26		
Woods Holl		3.80	25-26			
Minnesota.						
Red Wing		3.00	20-21			
Mississippi.						
Leakeville		4.53	3			
Moss Point		3.35	8			
Missouri.						
Platte River		3.52	18			
Sublette		3.00	21			
Nebraska.						
Auburn		2.88	1			
Crete		2.50	1			
Nebraska City		3.25	1			
Tecumseh		3.50	1			
New Jersey.						
Billingsport		2.60	10			
Egg Harbor City		2.81	9-10			
Freehold		2.54	10			
Ocean City		2.90	9-10			
New York.						
Marlboro		2.65	10			
Setauket		2.75	24-25			
North Carolina.						
Auburn		2.55	9			
Bailey		2.71	9			
Chapel Hill		2.65	9-10			
Charlotte		3.80	8-9			
Experiment Farm		3.50	9			
Fair Bluff		4.73	9			
Do		3.22	26	3.22	2 30	26
Falkland		4.25	9			
Fayetteville		4.85	9			
Do		2.76	27			
Goldsboro		3.53	8-9			
Henderson		2.50	9			
Lilesville		3.00	9			
Littleton		2.88	8-9			
Louistown		2.70	9			
Lumberton		5.38	9			
Mocksville		2.64	9			
Monroe		2.91	9			
Mount Pleasant		4.28	8-9			
Pantego		3.80	9			
Pittsboro		2.54	9			
Raleigh (W. B.)		3.97	8-9			
Raleigh (V. O.)		3.70	9			
Rockingham		4.00	8-9			
Salisbury		3.50	9			
Selma		4.05	9			
Skyuka		2.92	9			
Sloan		5.05	9			
Southern Pines		3.82	9			
Tarboro		3.46	9			
Wileyton		3.00	28			
Wilmington				2.06	1 50	4
Oregon.						
Astoria		13.19				
Bandon		9.84				
Detroit		11.34				
Glenora		17.39				

## Excessive precipitation—Continued.

State and station.	Monthly rainfall in inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Oregon—Cont'd.</i>						
Langlois	Inches.	Inches.		Inches.	A. M.	
Nehalem	11.33					
Tillamook Rock L. H.	13.03					
<i>Pennsylvania.</i>						
Browsers Lock		2.99	10			
Coatesville		3.19	9-10			
East Mauch Chunk		3.46	10			
Girardville		2.92	9			
Lansdale		2.61	11			
Lebanon		2.85	9-10			
Phoenixville		3.41	9-10			
Pottstown		2.55	9-10			
Reading		3.57	10			
Seisholtzville		2.85	10			
Selins Grove				1.64	1 30	3
Westtown		2.60	10			
Wilkesbarre		4.02	10			
<i>South Carolina.</i>						
Allendale		3.40	9			
Anderson		3.53	8-9			
Batesburg		5.02	8-9			
Blackville		3.50	8-9			
Blenheim		5.30	8-9			
Camden		3.15	8-9	2.00	2 00	27
Charleston		3.07	8-9			
Cheraw a		4.10	8-9			
Cheraw b		5.15	8-9			
Columbia		3.19	8-9			
Conway		3.80	8-9			
Cross Hill		4.62	8-9			
Edisto		2.65	8-9			
Effingham		2.75	9			
Flint Hill		3.90	8-9			
Florence		3.48	9			
Georgetown		3.52	9			
Hardeeville		3.12	8-9			
Hollands Store		3.26	8-9			
Kingstree a		3.99	8-9			
Kingstree b		3.30	9			
Little Mountain		4.00	8-9			
Longshore		4.13	8			
McCormick		3.50	8-9			
Mount Carmel		3.41	8-9			
Pinopolis		3.15	8-9			
Santuck		5.14	8-9			
Shaws Fork		3.95	9			
Society Hill		3.65	9			
Spartanburg		2.55	8-9			
Statesburg		2.59	8-9			
Trenton		5.53	8-9			
Watts		3.60	8-9			
Yorkville		3.95	8-9			
<i>Virginia.</i>						
Birdenest		2.80	10-11			
Buckingham		2.82	9			
Norfolk		3.00	9-10			
Richmond (near)		2.51	10			
<i>Washington.</i>						
Cascade Tunnel	11.47					
East Clallam	10.95					
Fort Canby	10.12					
Index	10.33					
Neah Bay	13.93					
Stampede	10.30					
Tatoosh Island	12.70					
Union City	10.47					
<i>West Virginia.</i>						
Westons				1.66	1 30	22
<i>Wisconsin.</i>						
Ashland		3.80	25-26			

By examining the preceding table it will be seen that the most interesting cases of excessive precipitation in twenty-four hours occurred on the 7th and 8th in Alabama; 8th, 9th, and 10th, in Georgia, North and South Carolina, in connection with low area No. IV, and on the 24th and 25th in Connecticut and Massachusetts, in connection with low area No. XVI.

The following tables give a summary of the preceding table and show the number of stations in each State reporting excessive precipitation during this month:

## Monthly precipitation to equal or exceed 10.00 inches.

State.	Number of stations.	State.	Number of stations.
Washington	8	Massachusetts	3
Oregon	7		



## Daily precipitation to equal or exceed 2.50 in 24 hours.

State.	Number of stations.	Dates.	State.	Number of stations.	Dates.
South Carolina....	34	8, 8-9, 9.	Virginia.....	4	9, 9-10, 10, 10-11.
Georgia.....	31	7-8, 8, 8-9, 9.	Iowa.....	3	1, 20, 20-21.
North Carolina....	29	8-9, 9, 9-10, 26, 27, 28.	Maryland.....	3	9, 9-10.
Massachusetts....	13	4-5, 10, 25-26.	Kansas.....	3	1, 18-19.
Pennsylvania.....	12	9, 9-10, 10, 11.	Mississippi.....	2	3, 8.
Alabama.....	11	7-8, 8, 8-9.	Missouri.....	2	18, 21.
Florida.....	7	4-5, 6, 6-7, 7-8, 8-9, 13, 29-30.	New York.....	2	10, 24-25.
Connecticut.....	6	10, 24-25.	California.....	1	20.
Nebraska.....	4	1.	Indian Territory.	1	2.
New Jersey.....	4	9-10, 10.	Michigan.....	1	20-21.
			Wisconsin.....	1	25-26.

## Hourly precipitation to equal or exceed 1.00 inch.

Florida.....	5	4, 6, 8, 11, 13, 13.	Iowa.....	1	20.
Arkansas.....	3	2.	Kansas.....	1	1.
North Carolina....	2	4, 26.	Kentucky.....	1	12.
Alabama.....	1	4.	Pennsylvania....	1	3.
Arizona.....	1	26.	South Carolina....	1	27.
Georgia.....	1	9.	West Virginia....	1	22.

## FREQUENCY OF EXCESSIVE PRECIPITATION.

The following tables show the frequency of excessive precipitation or the number of years for which monthly precipitation to equal or exceed 10.00 inches, daily precipitation to equal or exceed 2.50 inches, and hourly precipitation to equal or exceed 1.00 inch has been reported in the several States and Territories for October during the last twenty-four years:

## Frequency of excessive monthly precipitation.

State.	No. years noted.	State.	No. years noted.
Florida.....	14	Alabama.....	1
Texas.....	10	Arkansas.....	1
North Carolina....	8	Connecticut.....	1
Oregon.....	7	District of Columbia	1
Washington.....	7	Illinois.....	1
Georgia.....	5	Indiana.....	1
New Hampshire....	5	Indian Territory....	1
Louisiana.....	4	Iowa.....	1
New York.....	4	Kansas.....	1
California.....	4	Kentucky.....	1
Michigan.....	3	Maine.....	1
Massachusetts....	3	Mississippi.....	1
Virginia.....	3	New Jersey.....	1
Maryland.....	2	Ohio.....	1
Missouri.....	2	Rhode Island.....	1
South Carolina....	2	Tennessee.....	1

## Frequency of excessive daily precipitation.

Florida.....	19	Michigan.....	7
North Carolina....	17	District of Columbia	6
Texas.....	16	Ohio.....	6
Louisiana.....	14	Indian Territory....	6
Georgia.....	14	Wisconsin.....	6
Kansas.....	12	Oregon.....	5
Pennsylvania....	12	Arkansas.....	4
Illinois.....	12	Tennessee.....	4
New York.....	11	North and South Dakota	4
South Carolina....	11	Kentucky.....	4
Alabama.....	10	Minnesota.....	4
Maryland.....	10	New Hampshire....	4
Missouri.....	10	Washington.....	4
Massachusetts....	10	Indiana.....	4
Virginia.....	10	California.....	3
Rhode Island.....	9	West Virginia....	2
Connecticut.....	9	New Mexico.....	1
New Jersey.....	9	Utah.....	1
Maine.....	8	Vermont.....	1
Nebraska.....	8	Delaware.....	1
Mississippi.....	8	Montana.....	1
Iowa.....	8	Wyoming.....	1

## Frequency of excessive hourly precipitation.

Texas.....	10	Arkansas.....	2
Iowa.....	7	Pennsylvania....	2
Florida.....	6	Connecticut.....	1
Kansas.....	5	Indian Territory....	1
North Carolina....	5	Maryland.....	1
Illinois.....	5	Mississippi.....	1
Louisiana.....	4	New Jersey.....	1
Georgia.....	4	New York.....	1
Nebraska.....	4	Ohio.....	1
Alabama.....	3	Wisconsin.....	1
South Carolina....	3	Arizona.....	1
District of Columbia	2	Kentucky.....	1
Indiana.....	2	West Virginia....	1
Missouri.....	2		

## MAXIMUM RAINFALL FROM SELF-REGISTERING GAUGES.

The following table gives the heaviest rainfall during October, 1894, for periods of 5, 10, and 60 minutes, as recorded on self-registering rain gauges at regular stations of the Weather Bureau. This record refers strictly to rainfall. About 37 stations are furnished with self-registering float rain gauges and 6 with the self-registering-weighing rain-and-snow gauge. The float gauge does not record snowfall, and both forms are liable to be interrupted by snow or ice:

## Maximum rainfall in one hour or less.

Station.	Maximum rainfall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Atlanta, Ga.*.....	Inch.		Inch.		Inch.	
Baltimore, Md.....	0.02	8	0.04	8	0.16	8
Bismarck, N. Dak.....	0.07	31	0.10	10, 31	0.40	10
Boston, Mass.....	0.07	10	0.13	10	0.05	28
Buffalo, N. Y.*.....	0.06	13	0.14	13	0.40	10
Chicago, Ill.*.....	0.05	21	0.10	21	0.28	31
Cincinnati, Ohio.....	0.03	26	0.05	26	0.15	26
Cleveland, Ohio.....	0.06	1	0.10	1	0.12	5
Denver, Colo.....	0.01	27	0.02	27	0.07	27
Detroit, Mich.....	0.16	3	0.19	3	0.35	3
Dodge City, Kans.....	0.10	5	0.20	5	0.30	5
Duluth, Minn.....	0.06	7	0.11	7	0.38	25
Eastport, Me.....	0.03	9, 14	0.06	9, 14	0.25	9
Galveston, Tex.....	0.07	28	0.11	28	0.17	28
Indianapolis, Ind.....	0.20	1	0.30	1	0.65	1
Jacksonville, Fla.....	0.35	6	0.59	6	1.82	6
Jupiter, Fla.....	0.28	12	0.49	12	1.19	12
Kansas City, Mo.....	0.06	18	0.07	18	0.27	1
Key West, Fla.*.....	0.44	4	0.72	4	1.85	4
Louisville.....	0.06	12	0.10	26	0.16	26
Marquette, Mich.....	0.06	21	0.08	21	0.15	3, 13, 21
Memphis, Tenn.....	0.05	2, 29	0.10	2	0.30	28
Milwaukee, Wis.....	0.20	4	0.30	4	0.89	4
Nantucket, Mass.....	0.03	29	0.05	29	0.18	29
Nashville, Tenn.....	0.03	29	0.05	29	0.18	29
New Orleans, La.*.....	0.08	24	0.12	4	0.40	10
New York, N. Y.....	0.13	28	0.19	28	0.75	9
Norfolk, Va.....	0.13	31	0.20	31	0.35	31
Omaha, Neb.*.....	0.08	22	0.15	22	0.24	22
Philadelphia, Pa.....	0.13	4	0.25	4	0.62	4
Pittsburg, Pa.....	0.05	1	0.07	1	0.20	24
Portland, Me.....	0.08	31	0.11	31	0.26	31
Portland, Oreg.....	0.10	21	0.16	21	0.24	21
Rochester, N. Y.....	0.13	20	0.20	20	0.41	20
St. Louis, Mo.....	0.03	27, 31	0.06	27	0.19	27
St. Paul, Minn.....	0.10	23	0.16	23	0.56	23
Salt Lake City, Utah.....	0.30	4	0.32	4	0.41	9
San Diego, Cal.†.....	0.02	21	0.04	21	0.23	21
San Francisco, Cal.....	0.17	3	0.32	3	0.60	3
Savannah, Ga.....	0.09	31	0.12	31	0.36	31
Seattle, Wash.....	0.16	4	0.32	4	1.39	4
Vicksburg, Miss.....						
Washington, D. C.....						
Wilmington, N. C.....						

\* Record incomplete.

† Less than 0.05 in 1 hour.

## EXCEPTIONAL PRECIPITATION.

The following tables give exceptionally heavy monthly, daily, and hourly precipitations reported for October, by any station, regular or voluntary, and in any year since 1871:

## Exceptional monthly precipitation.

Station and state.	Amt.	Year.	Station and state.	Amt.	Year.
Reidsville, N. C.....	Inches.		Mayport, Fla.....	Inches.	
29.09†	1885		20.03	1880	
Sims, Cal.....	28.57	1889			

## Exceptional daily precipitation.

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
Fernandina, Fla.....	Inches.		Brewton, Ala.....	Inches.	
13.14	20-21, 1882		5.95	2, 1892	
Brackettville, Tex.....	13.08	1-2, 1881	Jupiter, Fla.....	5.95	10-11, 1892
St. Augustine, Fla.....	10.31	9-10, 1880	Blakely, Ga.....	5.80	8, 1894
Key West, Fla.....	9.24	20-21, 1883	Fort Meade, Fla.....	5.75	9, 1891
Newport, Fla.....	8.20	8, 1876	Amelia, Fla.....	5.67	1, 1891
Biloxi, Miss.....	8.00	1-2, 1893	Talbotton, Ga.....	5.67	8-9, 1894
Galveston, Tex.....	7.77	2, 1871	Evergreen, Ala.....	5.63	3, 1893
Mobile, Ala.....	7.47	1-2, 1893	Columbus, N. C.....	5.62	13-14, 1893
Fort Robinson, Neb.....	7.07	23, 1887	Bainbridge, Ga. b.....	5.60	8-9, 1894
Birdsnest, Va.....	6.85	7-8, 1891	Trenton, S. C.....	5.35	8-9, 1894
Lawrence, La.....	6.00	22, 1892	Vineyard Haven, Mass.....	5.40	25-26, 1894
Avon, Va.....	6.00	13-14, 1893	Saluda, Va.....	5.40	22, 1893
Gainesville, Tex.....	5.98	21-22, 1892	Lumberton, N. C.....	5.38	9, 1894



## Exceptional daily precipitation—Continued.

Station and state.	Amount.	Date.	Station and state.	Amount.	Date.
	Inches.			Inches.	
Logtown, Miss.	5.34	1-2, 1893	Abbeville, La.	5.05	21, 1890
Newton, Ala.	5.31	7-8, 1894	Union Springs, Ala.	5.05	8-9, 1894
Blenheim, S. C.	5.30	8-9, 1894	Sloam, N. C.	5.05	9, 1894
Daphne, Ala.	5.27	7-8, 1894	Batesburg, S. C.	5.02	8-9, 1894
Cheraw, S. C. b.	5.15	8-9, 1894	Trial, S. C.	5.02	22-23, 1890
Jacksonville, Fla.	5.15	1, 1890	Jordans Grove, Ill.	5.00	11-12, 1893
New Bedford, Mass.	5.15	23-24, 1890	Morganton, N. C.	5.00	13, 1893
Santuck, S. C.	5.14	8-9, 1894	Hillhouse, Ohio	5.00	13-14, 1893
Alapaha, Ga.	5.14	8-9, 1894	Piscata, Ga.	5.00	8-9, 1894
Columbus, Ga.	5.12	7-8, 1894			

## Exceptional precipitation for one hour or less.

Station and state.	Amount.	Time.	Date.
	Inches.	A. M.	
Key West, Fla.	0.44	0 05	4, 1894
Savannah, Ga.	0.38	0 05	3, 1893
Jupiter, Fla.	0.35	0 05	7, 1893
Do.	0.35	0 05	10, 1893
Savannah, Ga.	0.35	0 05	22, 1890
Jacksonville, Fla.	0.35	0 05	6, 1894
Key West, Fla.	0.35	0 05	9, 1891
Tampa, Fla.	0.30	0 05	20, 1893
Cleveland, Ohio.	0.30	0 05	13, 1890
Galveston, Tex.	0.30	0 05	30, 1890
Savannah, Ga.	0.30	0 05	4, 1894
Jupiter, Fla.	0.30	0 05	1, 1890
Key West, Fla.	0.30	0 05	10, 1890
New Orleans, La.	0.30	0 05	15, 1890
Jupiter, Fla.	0.28	0 05	12, 1894
Washington, D. C.	0.28	0 05	19, 1891
Vicksburg, Miss.	0.27	0 05	6, 1893
Jupiter, Fla.	0.25	0 05	24, 1893
Brownsville, Tex.	1.20	0 06	23, 1884
Key West, Fla.	0.72	0 10	4, 1894
Savannah, Ga.	0.63	0 10	3, 1893
Jupiter, Fla.	0.60	0 10	7, 1892
Jacksonville, Fla.	0.59	0 10	6, 1894
Charleston, S. C.	1.35	0 18	3, 1893
Fort Scott, Kans.	1.80	0 20	3, 1881
Cresco, Iowa.	1.11	0 20	10, 1878
Galveston, Tex.	2.12	0 25	30, 1877
Abitone, Tex.	1.50	0 25	24, 1885
De Moines, Iowa.	2.30	0 30	15, 1880
Key West, Fla.	1.85	0 33	4, 1894
Titusville, Fla.	2.60	0 50	12, 1892

\* Record incomplete.

## MONTHLY SNOWFALL.

The depth of snow that fell during the month of October, as reported by both regular and voluntary observers, is shown in detail, for stations reporting 1 inch or more, in the following table, which also gives the amount lying on the ground on the 15th and at the close of the month. It is also shown on Chart V.

The amount of snowfall on the higher portions of the Rocky Mountain regions, in California, Colorado, Montana, Idaho, Washington, Wyoming, and Alberta was larger than usual at this season of the year.

## DEPTH OF SNOW ON GROUND.

The depth of unmelted snow lying on the ground at 8 p. m. of the 15th and 31st is shown in the following table, and was appreciable at only a few stations in Washington and Colorado:

## Monthly snowfall and amounts on ground on the 15th and at close of month.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
	Inches.	In.	In.		Inches.	In.	In.
<b>California.</b>				<b>Colorado—Cont'd.</b>			
Cisco	9.0			San Juan	3.5		T.
Fordyce Dam	25.0			San Luis	3.5		
La Porte	5.0			Spring Gulch	18.0		
Summit	29.0			Stamford	4.0		
<b>Colorado.</b>				Steamboat Spring	5.0		
Breckenridge	13.5		2.0	Sunnyside	3.3		
Climax	20.0			<b>Idaho.</b>			
Divide Ex. Station	1.5			Atlanta	20.0		3.0
Lake Moraine	1.5		1.0	Fraser	5.0		
Moraine	1.0			Grangeville	4.0		
Pagoda (near)	3.0			Lake	11.0		
Red Cliff	20.0			Martin	1.0		
Rico	3.7			Paris	4.0		
Ruby	51.0		18.0	Swan Valley	1.2		

## Snowfall of 10 inches or more—Continued.

State and station.	Total.	15th.	31st.	State and station.	Total.	15th.	31st.
	Inches.	In.	In.		Inches.	In.	In.
<b>Iowa.</b>				<b>New Mexico.</b>			
Alta	4.0			Halls Peak	4.0		
Clarinda	2.5			<b>New York.</b>			
Larrabee	4.0			Arcade	2.0		
Logan	8.0			Humphrey	2.0		
Panama	4.0			Number Four	1.0		
<b>Maryland.</b>				Saranac Lake	1.0		1.0
Sunnyside	1.0			Turin	2.8		
<b>Massachusetts.</b>				<b>North Dakota.</b>			
Ludlow Center	1.0			Berlin	2.0		
<b>Michigan.</b>				Bottineau	2.3		
Rockland	1.5			Churchs Ferry	1.7		
<b>Minnesota.</b>				Dickinson	2.0		
Alexandria (a, b)	2.0			Forman	4.0		
Bird Island	1.5			Fort Yates	1.0		
Cambridge	2.0			Kelso	4.0		
Campbell	3.0			Larimore	5.6		
Collegeville	1.0			McKinney	1.6		
Fergus Falls	2.8			Napoleon	3.0		
Fort Ripley	1.0			Portal	3.0		
Granite Falls	3.0			Steele	3.5		
Lawrence	1.0			Wahpeton	3.0		
Leech Lake	2.0			White Earth	3.0		
Luverne	2.1			Wild Rice	2.0		
Milan	2.5			Williston	1.2		
Moorhead	3.3	0.0	0.0	Woodbridge	3.0		
Morris	4.2			<b>Oregon.</b>			
Ortonville	2.0			Crook	8.0		
Park Rapids	3.0			Joseph	5.0		
Pokegama Falls	1.2			Siskiyou	2.0		
St. Olaf	3.2			<b>Pennsylvania.</b>			
Sauk Center	1.0		T.	Cassandra	3.0		
<b>Montana.</b>				Clarion	1.5		
Billings	7.3			Grampian	1.0		
Butte	3.5			<b>South Dakota.</b>			
Cascade	3.0			Ashcroft	1.5		
Cokedale	10.0			Bowdle	2.0		
Columbia Falls	2.0			Clark	6.0		
Fort Custer	1.0			Flandreau	2.0		
Fort Logan	2.0			Fort Meade	1.2		
Fort Missoula	1.0			Frankfort	2.0		
Glendive	2.0			Gary	6.0		
Great Falls	1.2			Highmore	2.0		
Hayre	3.5			Oelrichs	2.0		
Helena	2.0			Spearfish	4.0		
Hogan	4.0			Webster	6.8		
Kipp	6.5			<b>Washington.</b>			
Marysville	8.4			Cascade Tunnel	11.5	0.0	8.0
Miles City	2.4			Hunters	1.5		
Mingusville	1.0			Waterville	1.0		
Pony	3.0			<b>Wyoming.</b>			
Red Lodge	3.0			Big Horn Ranch	2.0		
Virginia City	7.0			Fort Yellowstone	4.0		
<b>Nebraska.</b>				Sundance	7.0		
David City	2.0			<b>Canadian Stations.</b>			
Fontanelle	1.0			Rockliffe	3.0		
Hay Springs	3.0	0.0	T.	Perry Sound	1.6		
Norfolk	1.2			Minnedosa	8.1		
Omaha	5.0			Qu'Appelle	15.0		
Wakefield	6.5			Medicine Hat	2.0		
<b>Nevada.</b>				Calgary	1.1		
Fenelon	2.0			Prince Albert	7.6		
Hobart Creek	13.0			Edmonton	13.2		
Ruby Valley	1.2			Battleford	2.3		
Stofiel	1.0						
Tecoma	1.0						

## HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 1, 18, 19, 26. Arkansas, 2. Colorado, 5, 6, 18, 19, 20. Idaho, 2, 5, 6, 21, 24, 26. Illinois, 2, 6, 19, 21. Indiana, 20. Iowa, 20, 21, 24, 25, 30. Kansas, 6, 12, 18, 20, 27. Louisiana, 28. Maine, 14, 16, 17. Maryland, 13, 23, 24. Massachusetts, 10, 13, 14. Michigan, 3, 6, 9, 11, 12, 13, 22, 23, 31. Minnesota, 2, 6, 12, 13. Missouri, 18 to 21, 28, 29, 30. Montana, 2, 5, 9, 20. Nevada, 17, 18, 19, 26. New Hampshire, 14, 15, 17, 18. New Jersey, 14, 24, 31. New York, 4, 6, 10, 12, 13, 16, 17. North Carolina, 9, 26, 27. North Dakota, 20. Ohio, 3, 7, 13, 14, 22, 24, 27, 31. Pennsylvania, 13, 14, 26, 31. South Carolina, 27, 30. South Dakota, 7. Texas, 27, 28. Utah, 28. Vermont, 17. Washington, 4, 5, 8, 21, 22, 24, 26, 31. West Virginia, 5, 13, 22. Wisconsin, 12, 13, 24.

## SLEET.

The following are the dates on which sleet fell in the respective States:

California, 18. Colorado, 1, 2, 3, 5, 6, 7, 10, 11, 15 to 23, 27, 28. Indiana, 30. Iowa, 3, 7, 29, 30. Kansas, 28, 29, 30. Kentucky, 31. Maine, 13, 16. Maryland, 14. Michigan, 8, 10, 13, 14, 15, 25, 31. Minnesota, 3, 7, 10, 28, 29, 30. Mis-



souri, 29, 30, 31. Montana, 5, 6, 20, 25. Nebraska, 6, 7. Nevada, 18, 20, 26. New Hampshire, 15. New Jersey, 14, 24, 31. New Mexico, 20, 27, 31. New York, 13, 14, 15, 17. North Dakota, 7. Ohio, 13, 14, 31. Pennsylvania, 13, 14. South Dakota, 7, 8, 28. Utah, 31. Washington, 21. Wisconsin, 13, 30. Wyoming, 28.

## WIND.

## PREVAILING DIRECTIONS.

The prevailing winds for October, 1894, viz, those that were recorded most frequently at Weather Bureau stations, are shown in Tables I and VIII; they are not given on Chart II, as has hitherto been the custom, but the resultant winds are published instead.

## RESULTANT WINDS.

The resultant winds for the current month, as deduced from the hourly readings of self-registers at about 67 regular Weather Bureau stations, are given in Table VIII. Other resultants, deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart II, in connection with the isobars based on the same system of simultaneous observation; the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a wind of average velocity; these figures (or the ratio between them and the total number of observations in this month) indicate the extent to which winds from different directions counterbalanced each other. The original north, south, east, and west components are given in detail in Table IX.

During October the resultant movement was generally from the northwest in New England and on the south Pacific coast; from the southwest in the Ohio Valley and Tennessee, lower Lakes, upper Lakes, upper Mississippi, Missouri, middle Pacific coast region, and middle slope; from the northeast in the south Atlantic States and Florida, and southeast in the west Gulf States and northern plateau region.

## HIGH WINDS.

Maximum wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles.				Miles.	
Amarillo, Tex.	1	50	w.	Fort Canby, Wash.	27	50	se.
Atlantic City, N. J.	10	54	e.	Do.	28	53	e.
Block Island, R. I.	10	54	e.	Do.	29	55	se.
Do.	25	62	ne.	Do.	31	55	se.
Do.	26	68	ne.	Hatteras, N. C.	10	60	sw.
Cape Henry, Va.	9	66	ne.	Jacksonville, Fla.	9	62	se.
Do.	28	62	ne.	Kittyhawk, N. C.	9	58	se.
Cheyenne, Wyo.	1	54	w. *	Do.	10	58	sw.
Cleveland, Ohio	11	62	w.	Nantucket, Mass.	10	54	se.
El Paso, Tex.	27	50	sw.	Pensacola, Fla.	8	68	ne.
Fort Canby, Wash.	2	60	se.	Sioux City, Iowa	25	50	nw.
Do.	19	53	se.	Tatoosh Island, Wash.	23	54	e.
Do.	21	64	se.	Woods Holl, Mass.	10	60	sw.
Do.	24	70	se.	Do.	31	58	sw.
Do.	25	72	se.				

## LOCAL STORMS.

Destructive or severe local storms were reported as follows:

- 1st.**—Wichita, Kans., windstorm.  
**2d.**—Little Rock, Ark., tornado; 4 persons killed, 26 injured.  
**3d.**—Vicksburg, Miss., thunderstorm.  
**4th.**—Boston, Mass., thunderstorm.  
**6th.**—Jennings, Kans., thunderstorm.

**9th.**—Columbia, S. C., windstorm.

**13th.**—Friendship, N. Y., thunderstorm. Brinton, Pa., windstorm.

**16th.**—Bronson, Mich., cattle killed by lightning.

**20th.**—Alta, Hopeville, and Ovid, Iowa, windstorms. Kansas City, Mo., and Winfield, Kans., thunderstorms. Hallock, Minn., and Carlisle and Grafton, N. Dak., 1 person killed by lightning at each place.

**21st.**—Fort Canby, Wash., thunderstorm.

**25th.**—Near Louisville, Ill., thunderstorm.

**26th.**—Wilmington, N. C., hailstorm.

**28th.**—Coushatta, La., hailstorm.

## THE TORNADO AT LITTLE ROCK, ARK., OCTOBER 2.

The tornado that occurred at Little Rock, Ark., on October 2, has a special interest from the fact that it is the first case in which the center of the tornado passed immediately over a Weather Bureau station and left a well-marked record on the self-registering instruments. A facsimile of the barometric trace is reproduced on Chart I, and the following account is quoted verbatim from the report of Mr. George S. Harkness, Weather Bureau observer at that station:

During the day the sky was obscured by a stratum of light gray clouds, gentle southwesterly winds prevailed, and the thermometer was a little above the normal for the season.

About sunset the clouds changed to cumulo-stratus in the west, and lightning began to play. By 6 p. m. the play of the lightning was almost continuous; it was not observed in flashes, but rather by reflection from above the bank of gathered clouds; the temperature rose perceptibly, but was not ominously oppressive. These conditions prevailed until about 7.55 p. m., when light, spitting rain began to fall.

At the time of the regular afternoon observation the cloud conditions were about as follows: Apparently the clouds were all nimbus, the rain being as described, light, but the drops were large. In the west there was a stratum of light gray clouds, above which was a dark series of two or three clouds, making an appearance like points of lace, very deep slate at the base and becoming a lighter coloring and thinner at the extremities. The base was in the west and the clouds pointed to the east. Directly overhead the clouds were of cumulo-stratus formation, and were in a state of violent agitation without any well-defined direction, though apparently moving with the mass from the south.

The thermometer at the observation registered 78; the barometer, corrected, 29.66; the wind, 14 miles per hour from the south; humidity, 77, which was low considering the conditions; and the dew-point was 70.

The conditions were such as have often been observed at this place in case of violent thunderstorms, and this section never having experienced a tornado, your observer was not prepared for the character of the storm which followed.

The first evidence of the storm is shown about two miles west of the city, apparently originating there. The storm cloud moved from the south to the north for half a mile, then, describing an angle, continued its course from southwest to northeast till it reached the Insane Asylum, which is on the western border of the city. The damage done up to this time was very slight, a few trees being uprooted or snapped off, a frame barn, a small frame house, and a few smaller buildings damaged to a greater or less extent, the width of the path varying from a few feet to 200 yards, and the storm cloud only touching the earth at intervals. The ground here is rather low and rises gently toward the east, the Insane Asylum being situated on the crest of this rise. Owing to its exposed position, the large buildings of this institution suffered great damage from the fury of the storm. For the space of 50 feet the east wall of the south wing, which was three stories high, was blown off completely, falling outward toward the east as though the force exerted was from inside, as is often the case with storms of this character. Describing the south side of the storm's path as the right side and the north side as the left side, this wall was nearly the center of the path. Another building on the right side was damaged to some extent. The main entrance on the left side was almost completely ruined, and directly at the entrance Dr. Ingate, the asylum physician, was killed by an iron ornament being torn from the roof and falling through the three floors to the ground floor, where he was at the time.

The direction in which the debris lay upon the ground indicated the spiral movement of the wind in the storm cloud. The asylum fence 100 yards from the building was in the storm's path. The fence was probably 200 yards long,



and was divided almost in the center, the right half lying nearly toward the east and the left half toward the west.

Here the cloud lifted and did no further damage for a distance of half a mile; this distance included a valley. On the rising ground beyond the valley two houses were twisted upon their foundations, the east wall of a frame house being torn out. Dropping into a narrow valley at the other side of this rising ground, the storm executed one of its most remarkable freaks. First tearing away a small frame addition to the east side of a building, then lifting the house proper (which was a frame building) a distance of 15 feet, setting it down, then tearing off the four walls and the roof, destroying and scattering them about and leaving the floor where it lay with the four occupants in the center of the room unharmed.

Continuing through the woods, dropping down and rising at short intervals, a particularly good opportunity was afforded for observing the movement of the wind by the direction in which the large pine trees fell. The direction in which they lay was in accordance with the established theories in regard to the circular motion of the air. In the center of the path trees lying three or four feet apart were pointed in directly opposite directions.

The cloud continued along a hilly stretch of country, doing some damage here and there, until it reached the penitentiary buildings. Portions of these were leveled to the ground and the buildings very generally damaged. At the Penitentiary the direction of the cloud changed a little toward the north for one block and followed up Third street, unroofing some of the small houses in the neighborhood, breaking the glass, and otherwise destroying property. Further along Third street the better residence portion of the city was reached, and a great deal of damage done.

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Reaching the business portion of the city, the character of the damage became peculiar in the extreme. Large buildings were passed by unharmed and smaller buildings were chopped off and leveled on all sides. Cornices and roofs were blown from buildings for a distance of 100 yards from the right extremity of the storm.

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The storm continued down Markham street, doing more damage on the right than on the left side of its path, and disappeared in the river at the foot of Ferry street, no indication of its passage being found east of this point.

The total length of the path was probably 5½ miles. The shape of the cloud could not be determined, owing to the inky blackness of the night, but there are a few persons who report having noticed a distinct funnel shape. As evidenced by the distribution of damage done along its course, the storm had two distinct motions, a swaying one from side to side and a bounding motion.

[Remarks by the Editor.]

The small diagram on the side of Chart I gives a copy of the oscillations of the barometer, as recorded on the Richard barograph, alluded to by the observer in the preceding description. It will be observed that after a slight oscillation the record drops in a straight line from 29.31 to 28.93 and returns so quickly that the horizontal movement of the barograph sheet or its time scale is not sufficiently open to give any indication of the length of time consumed in this fall and rise. The appearance of the record would be about the same whether the movement of the pen down and back occupied one minute or one second. The statement of the observer is to the effect that "the storm struck the office of the Weather Bureau at 8.28 p. m. and probably consumed a minute in passing, and the barograph recorded a fall of 0.38 inch in the second consumed by the storm in passing."

In giving a proper interpretation to this fall of 0.38, we are confronted with the difficulty of deciding between two equally plausible and probable explanations, viz:

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The movements of our atmosphere are to be studied primarily as problems in the mechanics and thermodynamics of moving gases and vapors, but our knowledge of the empirical relations between atmospheric phenomena and those of terrestrial magnetism has been elucidated by a few special students, and further study in this direction has been recognized by the Chief of the Weather Bureau as proper and desirable. In accordance with the views that have been frequently explained by Professor Bigelow as to the action of the sun upon the earth there are two classes of influence that emanate from the sun, i. e., (1) a direct flow of energy that is known to us as sunshine and radiant energy; (2) an indirect flow that proceeds from the sun in curved lines which are called coronal beams when seen during a solar eclipse, or auroral beams when seen during an aurora, or magnetic curves when revealed by the disturbances of the magnetic needle. The coronal curves are normals to the so-called equipotential surfaces, and have the same form whether the phenomenon is one of fluid motion or of electric influence. In order to avoid any appearance of undue partiality to any theory, Professor Bigelow calls these lines the coronal field, because they were first studied in the photographs of solar eclipses. Those studies showed that the coronal field is as permanently attached to the sun as our own magnetic system is attached to the earth. The solar coronal poles and equator are analogous to the earth's magnetic poles and magnetic equator. Any influence that passes from the sun to the earth in straight lines through the mediation of the ether of space is considered to belong to the radiant field. Any other influence that proceeds along the coronal lines belongs to the coronal field, and if it reaches the earth and affects our atmosphere it is said to be superposed upon the radiant field. According to Professor Bigelow the solar corona and the coronal field revolve about the sun's axis and the synodic revolution is completed in 26.68 mean solar days; he finds the same period in terrestrial magnetic

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The object in collecting these data is to institute a comparison between the crude magnetic readings, particularly of the bifilar, and the temperature changes at meteorological stations in the northwest. Ultimately such comparisons will show how far unreduced magnetic observations may be available for determining the direction and the intensity of the temperature variations and other weather conditions before these become fully developed, as given by the isotherms and isobars of the daily weather maps. It has already been shown that weather and magnetism conform on the average to a normal type, but the problem of the synchronous changes from day to day is still under advisement as a practical feature in forecasting. The original data are presented on Chart VI in a slightly reduced form, without further comment, thus offering the reader an opportunity for individual study.

The columns headed Calgary, Williston, and Sioux City, give for each day, respectively, the mean of the 8 a. m. and 8 p. m. observations of temperature at the following groups of stations:

Calgary for Minnedosa, Qu'Appelle, Prince Albert, Swift Current, Medicine Hat, Battleford, Edmonton, Calgary.

Williston for Valentine, Yankton, Huron, Pierre, Moorhead, Bismarck, Williston.

Sioux City for Springfield, Mo., Kansas City, Wichita, Concordia, Omaha, Sioux City.

The average temperature for each group is reduced back to the origin, W. 115°, N. 55°, by a correction for eastward drift (see Amer. Jour. Sci., Dec., 1894). The first differences of these numbers are taken; then the monthly mean of the first

differences for slope; then the variations on the slope; then these latter are added successively throughout the month and the accumulated sums give the ordinates of the curve for each group; the mean of these three groups is taken and gives the curve in the upper part of Chart VI; the monthly mean of the ordinates being -5, this is added with reverse sign to reduce to a true datum line. Thus, the eastward drift and the slope have been eliminated, and the variations reduced to a zero base line. The final temperature variations are multiplied by -2, the minus sign being required for an inversion which seems to have prevailed during October.

The magnetic data are treated in the same way as the temperatures, excepting that in order to reduce to a similar amplitude the readings of horizontal magnetic force at San Antonio are divided by 3. The curve as plotted is the mean of the ordinates of the three stations.

It has been found that at least five magnetic observations are required to eliminate local conditions and to give a true value of the external impressed field, though seven are better. By inspecting the columns it will be seen that local variations disturb the curves in certain cases. Hence, as the data now exists, the comparison can give only partially accurate curves as to detail, though the main features may be expected to appear. No important magnetic disturbances were reported for October. The dates of beginning of the 26.68 day period are October 1.22 and October 27.90. These curves should be compared with the inverse type, and this has been effected by applying the factor -2 to the temperature data as above stated.

## INLAND NAVIGATION.

### STAGE OF WATER IN RIVERS.

The following table shows the danger point and the highest and lowest stages for the month of October, 1894:

*Heights of rivers above low-water mark, October, 1894.*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Shreveport, La. ....	29.2	— 2.3	14	— 4.9	31	2.6
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	3.4	2, 3	1.0	31	2.4
Little Rock, Ark. ....	23.0	5.0	1	2.9	31	2.1
<i>Missouri River.</i>						
Bismarck, N. Dak. ....	75.0	3.2	11, 12	2.8	8, 30, 31	0.4
Pierre, S. Dak. ....	13.0	2.3	22, 24, 25	1.8	6-13	0.5
Sioux City, Iowa ....	18.7	6.7	2	5.7	18, 19	1.0
Omaha, Nebr. ....	18.0					
Kansas City, Mo. ....	21.0	7.9	19	6.3	25, 26	1.6
<i>Mississippi River.</i>						
St. Paul, Minn. ....	14.0	2.2	12	1.6	18, 19, 27, 28	0.6
La Crosse, Wis. ....	10.0	1.9	31	1.2	1	0.7
Dubuque, Iowa ....	16.0	1.7	31	0.9	1-4	0.8
Davenport, Iowa ....	15.0	1.0	29-31	0.6	2-21	0.4
Keokuk, Iowa ....	14.0	0.7	30, 31	— 0.2	8, 10, 13	0.9
Hannibal, Mo. ....	17.0	1.2	31	0.5	8, 9, 11, 20	0.7
St. Louis, Mo. ....	30.0	4.0	1	2.4	23, 24, 29, 30	1.6
Cairo, Ill. ....	40.0	6.4	5, 6	2.9	31	3.5
Memphis, Tenn. ....	33.0	1.4	8, 9	— 1.1	30, 31	2.5
Vicksburg, Miss. ....	41.0	1.2	1	— 4.2	30, 31	5.4
New Orleans, La. ....	13.0	6.6	8	2.8	14, 28, 30, 31	3.8
<i>Ohio River.</i>						
Parkersburg, W. Va. ....	38.0	3.5	1	0.7	29, 30	2.8
Cincinnati, Ohio ....	45.0	9.0	1	3.5	24	5.5
Louisville, Ky. ....	24.0	6.3	1	2.4	25-27	3.9
<i>Cumberland River.</i>						
Nashville, Tenn. ....	40.0	0.5	1, 2	— 0.3	24-31	0.8
<i>Tennessee River.</i>						
Chattanooga, Tenn. ....	33.0	2.4	15	0.7	27-29	1.7
Knoxville, Tenn. ....	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa. ....	22.0	6.4	18	5.0	4, 10, 26	1.4

### Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Savannah River.</i>	<i>Feet.</i>	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>
Augusta, Ga. ....	32.6	27.6	10	5.4	31	22.2
<i>Willamette River.</i>						
Portland, Oregon ....	15.0	5.4	28	1.7	9	3.7
<i>Susquehanna River.</i>						
Harrisburg, Pa. ....	17.0					
<i>Alabama River.</i>						
Montgomery, Ala. ....	48.0	1.8	11	— 0.5	27-31	2.3
<i>James River.</i>						
Lynchburg, Va. ....	18.0	2.2	1	0.0	26-30	2.2
<i>Sacramento River.</i>						
Red Bluff, Cal. ....	22.0	8.5	24	0.7	3-17	7.8
Sacramento, Cal. ....	25.0	11.7	25, 26	7.5	10, 11	4.2
<i>Des Moines River.</i>						
Des Moines, Iowa*. ....	19.0	3.3	7-10, 28	3.0	1-4	0.3

\* Record for 20 days.

The above table shows that no floods occurred during the month in the rivers therein tabulated. In most cases the rivers were unusually low.

### FLOODS AND NAVIGATION.

The reports of floods were confined to a few rivers in the south Atlantic coast region. On the 9th the Congaree River at Columbia, S. C., rose 4.7 feet above the danger line, flooding the lowlands. As a rule, the rivers in the interior of the country reached extreme low water during this month and, in some cases, were lower than at any time during the past fifty years.



## STATE WEATHER SERVICES.

A tabular summary of the more prominent climatological features of each State and Territory, as given in the reports for October by the directors of the respective State Weather Services, is presented in Table XII. This table gives for the whole area of any State: (a) the average departure from the normal values of the current monthly mean temperatures and total precipitations; (b) the maximum and minimum temperatures and precipitations; (c) the greatest and least monthly ranges of temperature occurring anywhere within the State. This table is essentially a summary of Table II, and therefore presents a somewhat different study of meteorological conditions from that given in Table I, which is based on regular Weather Bureau stations arranged in so-called climatic districts.

The following extracts are taken from the reviews published by the respective services; occasional notes in brackets are added by the Editor:

**Alabama.**—An almost entire absence of rain with pleasant weather prevailed throughout the month. The conditions were all that could be desired for harvesting; an abundance of sorghum was made, after which attention was generally given to gathering cotton, corn, and potatoes, and all crops were mostly in by the end of the month. It has been altogether a very good crop year. The absence of rain during most of October has caused very low rivers, and a general opinion prevails that they are the lowest since 1839; this condition has suspended traffic on the rivers.

**Arkansas.**—The weather was very favorable for gathering cotton and corn, but too dry for plowing, and at the end of the month rain was needed to give wheat a start before winter set in. Killing frosts occurred in all portions of the State, but they were rather beneficial as they caused cotton to open more rapidly.

**Georgia.**—The month was marked by no severe storms or abnormally sudden temperature changes.

**Idaho.**—The month opened with cloudy weather and showery conditions prevailing generally over the State. The second week ushered in a dry spell, the beginning of which was marked by killing frosts and freezing temperatures in all sections; the temperature then rose slowly until the 18th, when a sudden fall in temperature was generally reported, accompanied by heavy showers, with snow in some localities. The temperature remained nearly stationary, with a tendency to rise, until the 27th, when a colder period began and continued during the remainder of the month. Light scattered showers were the rule after the 21st.

**Illinois.**—In the first half of the month lower temperatures prevailed, but during the last half the daily means of temperature were in excess, except on the last two days. The weather throughout the month was favorable to growing crops and farm work, especially to the cribbing of corn, but the limited amounts of local rains caused a continuance of the scarcity of stock water on many farms and kept pasturage in localities in poor condition.

**Kentucky.**—The rainfall occurred chiefly during the closing days of the month, but was badly distributed and wholly insufficient. The drought was very severe and damaging to farmers and stock raisers, many having to haul water a very great distance for stock use.

**Louisiana.**—The dry weather was a continuance of the drought that began

about the middle of September, but coming after the heavy rains of preceding months, and in harvesting season, the benefits to matured crops were vastly greater than if more rain had fallen. Excellent corn, hay, and cotton harvests were made, and even cane was benefited, though more rain was needed in the sugar belt than fell during the month. What was required for the cane was colder nights and some rain to ripen the stalk and make it more juicy.

**Missouri.**—The first snow of the season occurred on the 29th. In a few of the central and southwestern counties, wheat and pastures were badly in need of rain at the close of the month, but over the greater portion of the State wheat was reported as looking well and pasturage was good. Water for stock was still scarce in some of the central and northern counties.

**New England.**—The temperature for the month averaged 1.8 above the normal. Damaging frosts occurred in valleys on several dates, but in many upland districts flowers are blooming in the open air and tomatoes, peas, etc., are found in the gardens untouched by frosts. Many of the northern stations report a slight deficiency in the rainfall, but there was a marked excess in the south and southeast. The fall has been generally sufficient for grass roots and for new seeded fields, and the pastures and fields are in much better condition than at the end of September; but, except in the extreme south, the wells and springs have not been filled up to any extent, and at the close of October much more rain is needed.

**Oklahoma.**—Temperature below 32°, with slight freeze, throughout the Territory on the 29th and 30th, but on account of absence of moisture little damage was done to vegetation. The month was practically free from storms or unusual phenomena. Light frosts on the 8th, 29th, and 30th. The average date of first killing frosts in this latitude is about October 20.

**South Carolina.**—The most salient feature of the weather for this month was the subtropical storm whose center passed over the south-central portion of the State during the 8th to 9th. Streams were swollen and overflowed their banks and flooded the low country swamps, but, as the storm occurred late in the crop season, the resulting damage was comparatively small. Probably the rice fields suffered most and bottom-land corn next, but the latter had abundant time to dry thoroughly before being gathered, as the weather was clear and without rain for nearly three weeks after the storm. The weather during the month was very favorable for gathering corn, cotton, and other late crops, and for seeding oats.

**South Dakota.**—The weather during the month was generally favorable for late farm work, and much plowing was done. The weather was generally unusually pleasant and mild.

**Tennessee.**—The early crop of tobacco was considerably below the average, while the late crop is considerably better. The early corn crop was the largest and best in years, but the late corn is much below the average. Cotton has done fairly well throughout the greater portion of the season, and the yield is said to be good. The drought which set in about the middle of September, and which is the longest and most severe of which there is any record, has been very detrimental to the farmers, as it has prevented them from preparing land for and seeding wheat. This, combined with the low prices, will considerably lessen the acreage of the next crop. Wells and streams are dry and stock water scarcer than ever known in many localities.

**Wisconsin.**—Killing frosts occurred on the 1st at many stations, and from that date the temperature slowly decreased, reaching the minimum on the 14th, on which date the temperature throughout the State was 5° to 10° below freezing. On the 16th it rose to 70° and above, reaching the maximum for the month on that date. The remaining days were warmer than usual for October. As a whole, the month was an average one for the State, though the number of gales on the lake was greater than usual, some of which were quite severe.

## OBSERVATIONS ON THE GREAT LAKES.

## REPORTS FROM U. S. LIFE-SAVING STATIONS.

Through the co-operation of the General Superintendent of the Life-Saving Service and the Secretary of the Treasury, the Weather Bureau has received monthly reports for the month of October, from the keepers of 32 U. S. Life-Saving Stations on the Great Lakes.

## REPORTS FROM VESSELS.

The Lake Marine Section of the Forecast Division has received reports from the captains of 60 vessels navigating

the Great Lakes. The following miscellaneous items are extracted from their reports:

Capt. A. B. Drake, steamship *Thos. Maytham*, 16th, bright aurora nearly all night between Keweenaw Point and head of Lake Superior; 17th, bright aurora from midnight until 5 a. m., lower end of Lake Superior.

Capt. J. W. Morgan, steamship *Australasia*, 2d, northern Lake Superior, very bright aurora from 10.30 to 11.45 p. m.

Capt. J. L. Weeks, steamship *City of Genoa*, 16th, Lake Superior, northern lights from 10.30 p. m. to 2 a. m., 17th.

Capt. D. MacLean, steamship *City of Duluth*, 16th, Lake Michigan, northern lights observed at 10.15 p. m.

Capt. Edward Mooney, steamship *Wa-Wa-Tam*, 15th, Lake Superior, northern lights for fifteen minutes; Lake Huron, northern lights from 12.30 to 3 a. m.

## SUNSHINE AND CLOUDINESS.

## GENERAL REMARKS.

The quantity of sunshine, and therefore of heat, received by the atmosphere is a fundamental factor in meteorology; the quantity received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends largely upon the absorption by the atmosphere and varies with the distribution of cloudiness. The sunshine is now recorded automatically at about 38 regular stations of the Weather Bureau, either by its photographic or its thermal effects. The cloudiness is recorded by personal observations at all stations and is given in the column of "average cloudiness" in Table I.

## SUNSHINE.

An instrumental record of sunshine has been kept during the month at 18 stations by means of the photographic sunshine recorder and at 20 stations by means of the thermometric sunshine recorder; the results of these observations are given in Table IV, for each hour of local mean time (not seventy-fifth meridian time). The stations recording the largest percentages of sunshine between the hours of 11 a. m. and 1 p. m. were: Vicksburg, 94.5; Santa Fe, 93.5; Denver, 93; Dodge City, 91.5; Memphis and Galveston, 91; Tucson, 90.5. The stations having the least percentage between these hours were: Portland, Oreg., 36.5; Eastport, 44; Rochester, 48.5; Spokane, 50; Detroit, 53.5.

The general average percentage for the whole month is given in the next to the last column of Table IV. The highest percentages were: Vicksburg, 91; Santa Fe, 90; Denver, 89; Memphis and Tucson, 87; Galveston and Dodge City, 86; Little Rock, 84. The lowest percentages were: Portland, Oreg., 30; Rochester, 39; Eastport, 42; Chicago, 43.

## CLEAR SKY.

The average cloudiness between sunrise and sunset, as based on numerous personal observations, is given for each Weather Bureau station in Table I; the complement of this average

cloudiness gives the observer's estimated percentage of clear sky and these latter numbers are given in the last column of Table IV.

## COMPARISON OF SUNSHINE AND CLEAR SKY.

The sunshine registers give the duration of direct sunshine whence the percentage of possible sunshine is derived; the observer's personal estimates give the percentage of area of clear sky. It should not be assumed that these numbers should agree, and for comparative purposes they have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental record of percentages of duration of sunshine is almost always larger than the observer's personal estimates of percentages of area of clear sky; the average excess for this month is 8 per cent for photographic records and 8 per cent for thermometric records:

## Difference between instrumental and personal observations of sunshine.

Photographic stations.	Instrumental.			Thermometric stations.	Instrumental.		
	Instrumental.	Personal.	Difference.		Instrumental.	Personal.	Difference.
Santa Fe, N. Mex. ....	90	80	10	Vicksburg, Miss. ....	91	89	2
Denver, Colo. ....	89	69	20	Little Rock, Ark. ....	84	67	15
Memphis, Tenn. ....	87	86	1	St. Louis, Mo. ....	71	65	6
Tucson, Ariz. ....	87	77	10	Salt Lake City, Utah. ....	73	68	5
Galveston, Tex. ....	86	86	0	Wilmington, N. C. ....	70	69	1
Dodge City, Kans. ....	86	77	9	Key West, Fla. ....	69	47	22
Savannah, Ga. ....	77	68	9	Louisville, Ky. ....	69	58	11
Kansas City, Mo. ....	75	71	4	Des Moines, Iowa. ....	60	56	4
San Diego, Cal. ....	72	69	3	Baltimore, Md. ....	58	54	4
Cincinnati, Ohio. ....	71	60	11	Columbus, Ohio. ....	58	50	8
San Francisco, Cal. ....	67	64	3	New Haven, Conn. ....	58	50	8
Bismarck, N. Dak. ....	61	59	2	Philadelphia, Pa. ....	58	44	14
Helena, Mont. ....	59	49	10	New York, N. Y. ....	54	48	6
Washington, D. C. ....	57	54	3	Portland, Me. ....	51	37	14
Cleveland, Ohio. ....	55	44	11	Boston, Mass. ....	48	38	10
Spokane, Wash. ....	51	35	16	Buffalo, N. Y. ....	47	32	15
Eastport, Me. ....	42	33	9	Detroit, Mich. ....	46	39	7
Portland, Oreg. ....	30	31	-1	Chicago, Ill. ....	43	41	2
				Rochester, N. Y. ....	39	43	-4
				New Orleans, La. ....	.....	86	.....

\* For 28 days.

## NOTES BY THE EDITOR.

## EARLY SNOWS IN CONNECTICUT FROM 1783 TO 1882.

Notes of remarkable early snows in Connecticut, communicated by Miss E. D. Larned of Thompson, Windham Co., Conn.:

- 1783, November 21.—Snow 6 inches deep.  
 1792, November 23.—Snowed two days; drifted very much; roads impassable.  
 1793, October 29.—Snowed all day; very cold.  
 1797, November 17.—Exceeding cold for the season; snowed considerably.  
 1798, November 2.—Last night it snowed a good deal.  
 1800, November 21.—Snowed hard all day; storm very severe. November 23, snowed some; believe the snow is a foot deep; very good sleighing.  
 1804, November 12.—Yesterday and to-day it has snowed considerably.  
 November 14, it snowed pretty hard most of the day.  
 1805, October 26.—Snowed most of the day.  
 1806, November 16.—Snowed all day; snow 8 or 9 inches deep; quite wintry weather.  
 1808, November 15.—Snowed steadily all day.  
 1809, November 24.—A severe snowstorm all day. November 25, snow nearly a foot deep; people move in sleighs.  
 1810, November 2.—Had a severe snowstorm; great quantities of corn, apples, etc., are still outdoors; severe winter weather.  
 1811, November 20.—Snowed most of the day; storm very tedious.  
 1813, November 15.—Snowed steadily all day; snow more than a foot deep; sleighs move considerably.  
 1819, November 29.—Last night we had considerable snow.  
 1820, November 12.—Snows in the night and all day; a right winter-cold snowstorm about 8 inches on the level and very solid; hard sleighing; good sledding for a week.

- 1821, November 30.—Snowed all day and night.  
 1827, November 6.—Severe snowstorm, about 9 inches.  
 1829, November 27.—Snows considerable.  
 1831, November 22.—Considerable snow, not melted till January.  
 1833, November 25, 26.—Snowy.  
 1835, November 23.—Snowed all day; very cold.  
 1836, November 17.—Considerable snow.  
 1837, November 14.—Severe snowstorm.  
 1838, October 28, 29.—Snow; November 8, hard storm and very cold.  
 November 18, 24, 25, snows and extreme cold.  
 1840, October 25.—A tedious snowstorm; snow fell a foot deep in some places and lay for several days.  
 1841, October 3.—First snowfall; at some places people went to town meeting in sleighs. November 8, a hard snowstorm. Between October 3 and November 22, ground covered with snow four or five times.  
 1842, November 30.—First snowstorm.  
 1843, November 29.—First snow.  
 1844, November 28.—Snowed all day about 5 inches, mercury 10°; some sleighs moved.  
 1846, November 25.—A hard snowstorm all day.  
 1848, November 11.—Snowed steadily and pretty fast all day. November 20, a very uncommon fall of snow—said to be about 18 inches deep. Sleighs are very thick.  
 1851, October 27.—A tedious snowstorm.  
 1852, November 23.—Snowed all day.  
 1854, November 16.—Some snow.  
 1855, November 17.—Snowy afternoon. November 20, snowed all day and night; good sleighing.  
 1856, November 29.—Hard snowstorm; very high wind.  
 1858, November 14.—Heavy snow.  
 1861, November 29, 30.—Slight snow.



1862, November 7, 8.—Violent storm; much snow.  
 1864, November 13, 14.—Snow enough for sleighing.  
 1865, November 5.—Some snow.  
 1866, November 22, 23.—Two days' snowstorm.  
 1867, November.—Four inches of snow.  
 1868, October 17.—Snowed some hours.  
 1869, October 27-30.—Snowed some hours each day.  
 1871, November 10.—Rain, hail, and snow.  
 1872, November 20.—Snow, hail, and thunder.  
 1873, November 12.—Hard storm. November 18, another snowstorm.  
 Winter weather and good sleighing.  
 1874, November 20.—Snowed considerably.  
 1875, November 19.—Snowed some hours.  
 1876, October 15.—Snowed all day; 4 or 5 inches deep.  
 1877, November 20.—First snow.  
 1879, November 3.—First snow.  
 1882, November 25.—First snow.

The snows within the last decade, 1883 to date, have been late and scant. The "election" snowstorm, November 5-6, 1894, was the most severe in many years so early in the season. It brings up the average for snowstorms in October and early November to about one in ten years for one hundred and ten years; depth of snow in Thompson, 8 to 10 inches.

## OBSERVATIONS AT HONOLULU, HAWAIIAN ISLANDS.

As the weather on our Pacific coast depends so largely upon the conditions of the atmosphere to the westward, it is considered important to publish in full and as soon as practicable the data furnished by observers in Alaska, the Hawaiian Islands, and adjacent regions.

*Meteorological observations at Honolulu, Republic of Hawaii, by Curtis J. Lyons, Meteorologist to the Government Survey.*

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.05, is still to be applied.

The absolute humidity is expressed in grains of water, per cubic foot, and is the average of four observations daily.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

## AUGUST.

Date.	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Direction.	Force.			
									9 a. m.	9 p. m.					
1..	Ins.	Ins.	Ins.	0	0	0	0	0	0	0	e., s.	1	Ins.		
2..	30.10	30.04	30.12	70	82	73	65	84	71	79	s.	1	0.00		
3..	30.11	30.05	30.12	70	81	77	66	84	73	64	s., ne.	0-3	0.01		
4..	30.11	30.05	30.10	69	84	76	66	85	66	85	ne.	4	0.00		
5..	30.11	30.04	30.08	73	80	75	72	83	59	65	ne.	4	0.02		
6..	30.11	30.05	30.09	72	80	76	70	83	56	64	ne.	4	0.01		
7..	30.10	30.05	30.11	72	80	75	71	84	58	67	ne.	4	0.00		
8..	30.10	30.04	30.11	72	81	75	69	85	56	73	ne.	3	0.03		
9..	30.11	30.06	30.10	72	81	76	66	84	56	63	ene.	4	0.00		
10..	30.11	30.06	30.10	74	81	75	72	84	61	63	ene.	4	0.01		
11..	30.12	30.06	30.10	73	80	75	72	83	60	74	ene.	5	0.01		
12..	30.16	30.08	30.11	73	79	76	73	82	65	63	nne.	5	0.01		
13..	30.16	30.08	30.15	73	80	76	71	82	58	67	e.	6	0.00		
14..	30.15	30.09	30.15	73	78	75	71	81	61	63	ene.	5	0.00		
15..	30.14	30.07	30.12	74	79	76	72	83	56	65	ne.	5	0.02		
16..	30.16	30.12	30.17	74	80	76	72	83	58	73	ene.	5	0.00		
17..	30.17	30.10	30.14	74	81	76	73	84	63	63	ene.	5	0.01		
18..	30.13	30.06	30.09	74	79	75	73	84	56	70	ne.	5	0.00		
19..	30.10	30.05	30.11	72	80	76	70	83	55	67	ne.	5	0.03		
20..	30.13	30.06	30.11	73	81	76	71	83	55	65	ne.	4	0.01		
21..	30.12	30.06	30.12	70	83	73	67	84	60	80	nne.	4	0.00		
22..	30.12	30.03	30.10	74	82	76	71	84	71	77	ne.	4	0.03		
23..	30.09	30.03	30.09	74	81	75	73	83	67	69	ne.	3	0.00		
24..	30.06	30.00	30.05	64	82	70	63	84	53	67	se.	3	0.00		
25..	30.06	30.03	30.09	70 <sup>4</sup>	81	72	70	83	63	70	ne.	3	0.00		
26..	30.12	30.05	30.10	71	82	74	70	84	57	73	nne.	3	0.02		
27..	30.08	30.01	30.09	71	83	74	71	86	57	67	nne.	3	0.00		
28..	30.04	29.97	30.04	68	83	76	68	86	55	74	s., ne.	2	0.00		
29..	30.04	29.97	30.03	72	81	76	71	83	70	67	nne.	0-4	0.00		
30..	30.04	29.98	30.05	70	83	74	68	86	62	75	ne.	4	0.00		
31..	30.07	30.00	30.07	71	83	76	68	86	71	75	s., ne.	0-4	0.00		
31..	30.07	30.00	30.06	70	84	74	67	86	61	77	ne.	3	0.00		
30.106 30.043 30.099 71.7 81.1 75.2 69.7 83.6 62.4 69.3 6.53 3-7 0.32															

Pressure, 30.075, or 0.04 above normal.

Temperature, 76.0°, or 1.8° below normal.

Relative humidity, 2 per cent below normal.

Rainfall, one-sixth of the normal.

Disturbance periods, 4th, 15th, and 20th; heavy swell at sea 16th to 21st.

## SEPTEMBER.

Date.	Pressure at sea level.			Temperature.					Humidity.			Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Direction.	Force.			
									9 a. m.	9 p. m.			Absolute.		
1..	Ins.	Ins.	Ins.	68	84	76	67	86	53	69	6.9	ne.	3	S. 75 W.	Ins.
2..	30.07	30.02	30.02	68	84	77	73	84	55	65	6.2	e., ne.	4	.....	0.00
3..	30.08	30.06	30.11	74	83	77	74	85	58	69	6.9	e., ne.	4	.....	0.00
4..	30.11	30.03	30.12	72	85	77	71	86	68	70	7.4	ne.	3	.....	0.03
5..	30.14	30.06	30.11	76	82	77	75	84	68	64	6.8	ne.	5	.....	0.03
6..	30.11	30.02	30.07	76	81	77	75	83	51	67	6.3	ene.	6	S. 60 W.	0.01
7..	30.09	30.01	30.07	75	81	77	73	83	59	67	6.6	ne.	6	S. 40 W.	0.02
8..	30.07	30.01	30.04	75	81	77	73	83	55	59	6.1	ne.	3.5	S. 60 W.	0.01
9..	30.06	29.99	30.05	74	81	74	69	83	59	77	6.6	e., s.	1	.....	0.03
10..	30.03	29.94	30.03	72	82	75	68	84	63	73	6.7	ne.	4	.....	0.02
11..	30.04	29.96	30.06	68	84	76	67	85	61	73	6.8	e.	3	N. 70 W.	0.00
12..	30.05	30.00	30.06	69	82	78	68	86	73	73	7.3	s.	3	S. 60 W.	0.00
13..	30.10	30.05	30.12	72	80	76	71	85	64	64	7.0	ne.	4	S. 70 W.	0.00
14..	30.15	30.08	30.14	76	82	77	75	85	56	66	6.4	ne.	5	.....	0.00
15..	30.12	30.03	30.09	75	79	77	75	82	60	65	6.6	ne.	4	.....	0.00
16..	30.08	30.00	30.07	73	79	75	73	83	60	75	6.9	ne.	4	S. 80 W.	0.02
17..	30.08	29.99	30.05	72	80	76	69	81	68	66	6.7	ne.	4	.....	0.19
18..	30.05	29.99	30.05	73	81	76	71	83	60	63	6.3	ne.	4	S. 80 W.	0.05
19..	30.07	30.00	30.05	74	81	75	74	84	56	67	6.3	ne.	4	.....	0.00
20..	30.06	29.99	30.05	71	77	72	70	84	76	84	7.2	se., n.	1	W.	0.00
21..	30.06	29.98	30.06	70	81	72	68	82	75	89	7.3	ne.	3	S. 60 W.	0.07
22..	30.06	29.99	30.06	73	80	75	69	81	66	66	6.4	ene.	4	S. 30 W.	0.07
23..	30.08	30.03	30.08	73	80	76	71	82	72	66	6.8	ene.	5	S. 30 W.	0.06
24..	30.12	30.04	30.10	74	78	75	71	82	67	66	6.3	ne.	4	.....	0.05
25..	30.10	30.03	30.11	74	81	75	74	82	69	70	6.3	ne.	4	.....	0.01
26..	30.14	30.07	30.15	72	82	75	70	83	63	65	6.5	ne.	4	.....	0.07
27..	30.19	30.12	30.17	73	80	76	72	82	67	70	7.0	ne.	4	.....	0.09
28..	30.20	30.12	30.18	75	81	76	74	83	58	67	6.4	ne.	5	S. 40 W.	0.00
29..	30.17	30.10	30.17	74	79	75	74	82	57	66	6.3	ne.	5	.....	0.03
30..	30.17	30.09	30.14	74	77	75	73	81	80	67	6.8	ne.	4	E.	0.02
	30.099	30.027	30.092	73.1	80.9	75.7	71.6	83.3	63.5	69.6	6.76				1.47

Disturbance periods, 4th, 15th, and 20th.

NOTE.—Under date of October 11 Mr. Lyons states that the summer of 1894 in Honolulu was cool and dry, with high barometer and only a few hot days at the end of August; but that October begins by being more showery than usual, and that a rainy winter is expected, which may mean a severe winter in the United States, as he has generally noticed a similarity in the character of the seasons in these two countries.

## OCTOBER.

Date.	Pressure at sea level.			Temperature.					Humidity.		Wind.		Cirrus cloud moving from—	Rain measured at 6 a. m.	
	9 a. m.	3 p. m.	9 p. m.	6 a. m.	2 p. m.	9 p. m.	Minimum.	Maximum.	Relative.		Direction.	Force.			
									9 a. m.	9 p. m.					Absolute.
1..	Ins.	Ins.	Ins.	0	0	0	0	0	5	5	6.4	nne.	5	Ins.	
2..	30.08	30.00	30.05	72	81	75	73	83	60	70	6.4	nne.	3	0.02	
3..	30.00	29.90	29.99	66	83	71	65	83	57	76	6.2	ne.	2-0	0.00	
4..	29.99	29.95	30.02	67	72	69	67	80	71	95	7.1	s.	1	0.00	
5..	30.03	29.95	30.01	70	73	70	68	76	95	68	7.6	s.w.	1	0.05	
6..	29.98	29.91	30.00	70	79	74	69	80	80	89	7.6	sw.	1	0.44	
7..	30.07	30.00	30.09	74	81	76	73	82	75	68	7.1	ene.	1.5	0.18	
8..	30.12	30.06	30.11	74	79	75	73	82	59	66	6.3	ne.	4	0.01	
9..	30.09	30.02	30.09	73	77	73	71	78	55	75	6.8	nne.	3	0.04	
10..	30.07	29.99	30.08	72	78	72	71	80	83	70	6.7	ne.	4	0.24	
11..	30.09	30.00	30.08	71	79	74	70	80	74	73	6.7	ne.	4	0.12	
12..	30.08	30.01	30.08	67	80	75	66	81	63	69	6.4	ne.	3	0.06	
13..	30.10	30.02	30.09	72	79	74	66	82	63	66	6.3	nne.	4	0.00	
14..	30.08	29.99	30.07	67	82	71	66	84	71	90	7.3	e. s.w.	0.1	0.01	
15..	30.08	30.01	30.09	72	80	75	68	82	60	70	6.4	ne.	3.4	0.75 W.	
16..	30.11	30.04	30.12	72	79	76	71	81	66	67	6.4	ne.	4	0.01	
17..	30.13	30.06	30.11	74	74	74	70	79	66	70	6.6	nne.	4	0.70 W.	
18..	30.12	30.04	30.10	73	79	75	69	81	60	70	6.8	ne.	3	0.04	
19..	30.12	30.07	30.15	73	80	74	72	82	60	66	6.4	ne.	4	0.07	
20..	30.15	30.07	30.15	73	80	74	72	82	60	66	6.4	ne.	3	0.07	
21..	30.13	30.05	30.12	73	78	73	67	80	59	80	6.8	ne.	3	0.02	
22..	30.14	30.05	30.12	70	79	75	68	80	64	70	6.5	ne.	4	0.08	
23..	30.12	30.04	30.11	73	79	75	72	81	64	69	6.4	ne.	4	10 W. cir.	
24..	30.13	30.05	30.11	74	77	75	73	80	68	70	6.6	ene.	5	0.10 e.	
25..	30.14	30.06	30.14	74	77	75	73	81	71	79	6.7	ene.	5	0.07	
26..	30.18	30.10	30.16	74	79	75	74	80	69	70	6.4	ne.	5	0.03	
27..	30.15	30.07	30.14	73	79	74	73	80	67	70	7.0	ne.	4	0.03	
28..	30.13	30.03	30.13	73	76	74	73	80	67	67	6.8	ne.	4	0.80 W.	
29..	30.13	30.05	30.13	73	79	75	72	81	64	63	6.2	ne.	4	0.00	
30..	30.15	30.05	30.12	74	79	75	75	80	95	66	6.2	ne.	5	0.00	
31..	30.12	30.04	30.12	73	79	74	73	80	99	70	6.2	ne.	5	0.00	
30.103 30.024 30.097 71.6 78.7 73.9 70.2 80.6 63.5 72.0 66.63															2.62



TABLE I.—Climatological data for Weather Bureau Stations, October, 1894.

Districts and stations.	Elevation above sea-level, feet.	Length of record, years.	Pressure, in inches.		Temperature of the air, in degrees Fahrenheit.					Humidity and precipitation.					Wind.			Mean temperature data since opening of station.														
			Mean pressure, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean minimum.	Date.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.	Year.	Lowest for month.													
New England.																																
Eastport.....	76	22	29.88	29.97	-.04	53.1	+ 2.1	61	4	54	35	16	44	18	42	80	0.68	+ 2.4	8,110	42	se.	10	4	13	12	6-7	50.3	1876	43-7	1888		
Portland.....	103	23	29.85	29.95	-.09	48.6	- 2.3	67	5	57	33	16	44	24	43	80	4.65	- 0.6	5,654	41	e.	10	4	13	14	6-3	55.8	1879	43-4	1888		
Northfield.....	872	8	29.93	29.98	-.06	47.8	- 3.7	71	20	56	30	29	39	32	42	86	3.50	- 0.7	8,417	36	nw.	17	8	13	12	6-1	47.8	1894	39-0	1888		
Boston.....	125	24	29.86	30.00	-.06	54.0	- 2.5	76	20	61	38	16	47	26	44	75	5.11	- 0.8	8,881	49	e.	10	8	9	14	6-1	56.0	1879	47-4	1888		
Nantucket.....	14	8	29.99	30.00	-.09	54.9	- 1.1	68	4	60	40	15	50	18	48	78	10.05	- 5.0	10,278	54	se.	10	13	9	13	4-9	54.9	1894	49-2	1888		
Woods Holl.....	17	8	29.99	30.00	-.09	55.6	- 2.0	70	4	60	42	15	50	18	48	78	9.29	- 5.4	12,793	50	sw.	10	10	9	13	5-6	58.1	1879	49-4	1888		
Vineyard Haven.....	17	8	29.99	30.00	-.09	55.6	- 3.5	72	4	62	41	15	51	22	49	79	10.88	- 6.6	13	54	sw.	10	11	4	16	5-6	56.6	1894	50-4	1888		
Block Island.....	27	15	29.97	30.00	-.11	56.0	- 1.7	66	3	61	40	15	51	17	49	79	6.15	- 1.8	15,214	84	e.	10	11	9	11	5-2	57.4	1882	49-7	1888		
Narragansett Pier.....	13	13	29.87	29.99	-.09	53.0	- 0.7	70	2	61	32	16	45	31	46	78	8.11	- 3.5	14	ne.	ne.	18	3	10	5-6	56.3	1882	47-8	1888			
New Haven.....	107	22	29.87	29.99	-.09	53.2	- 0.9	71	2	61	35	19	45	38	46	78	6.11	- 2.0	7,724	37	n.	25	13	13	5-0	58.7	1879	47-6	1888			
New London.....	45	24	29.97	30.03	-.06	54.0	- 1.0	69	1	61	36	16	47	24	48	83	7.21	- 2.7	6,441	37	w.	31	11	8	5-4	58.4	1879	49-3	1888			
Mid. Atlantic States.																																
Albany.....	85	21	29.90	29.90	-.08	53.2	- 1.9	70	20	61	36	16	46	30	45	80	4.62	- 1.1	5,325	30	se.	3	11	6	11	6-1	56.4	1882	45-6	1888		
New York, N. Y.....	165	24	29.80	29.90	-.09	57.2	- 1.3	75	3	64	39	15	50	23	46	73	5.83	- 2.4	9	48	ne.	10	15	5	14	5-2	58.9	1879	49-7	1876		
Harrisburg.....	377	7	29.61	30.03	-.03	55.4	- 2.9	81	3	63	36	16	48	29	47	75	4.60	- 1.3	5,360	36	w.	14	10	11	10	5-4	58.8	1888	50-2	1889		
Philadelphia.....	117	24	29.89	30.01	-.10	57.2	- 0.6	82	3	64	37	15	50	25	47	75	4.66	- 1.7	7,862	39	n.	10	11	8	12	5-6	61.4	1879	50-4	1888		
Atlantic City.....	53	21	29.96	30.01	-.08	57.4	- 1.1	76	17	63	38	15	52	22	50	78	5.20	- 1.9	9,706	54	e.	10	12	5	14	5-6	61.2	1881	50-8	1876		
New Brunswick.....	179	24	29.82	30.03	-.09	55.2	- 0.7	75	3	64	32	16	46	37	49	79	4.87	- 0.7	13	ne.	ne.	8	9	14	6-2	56.4	1881	50-8	1876			
Baltimore.....	179	24	29.82	30.03	-.09	57.4	- 0.6	85	3	65	36	15	50	30	46	71	3.80	- 0.7	5,808	32	nw.	10	15	7	9	4-6	63.1	1881	51-8	1876		
Washington, D. C.....	112	24	29.91	30.03	-.09	57.0	- 0.6	84	3	65	36	16	49	33	47	76	4.929	- 0.1	4,929	30	nw.	10	17	3	11	4-6	62.9	1881	50-7	1876		
Cape Henry.....	21	21	29.91	30.03	-.09	62.8	- 0.2	84	3	69	41	16	56	36	49	78	4.31	- 0.5	10,177	66	ne.	9	17	5	9	4-6	67.7	1881	57-1	1876		
Lynchburg.....	685	24	29.31	30.05	-.06	59.0	- 0.7	84	3	69	36	16	49	36	49	78	3.64	- 0.3	3,011	22	nw.	6	18	6	7	4-0	65.2	1881	53-6	1876		
Norfolk.....	57	24	29.95	30.02	-.09	62.4	- 0.4	85	3	69	41	16	56	37	54	80	6.05	- 2.1	6,835	39	ne.	9	18	4	9	4-2	66.8	1881	50-2	1876		
S. Atlantic States.																																
Charlotte.....	773	15	29.22	30.04	-.07	61.0	- 0.6	85	1	70	39	15	52	29	49	72	6.12	- 2.3	8	4,626	aw.	9	22	6	3	2-6	66.4	1884	56-8	1891		
Hatteras.....	11	14	30.02	30.03	-.06	64.8	- 0.9	79	3	69	50	16	60	16	58	81	5.77	- 0.7	10	10,117	n.	10	15	11	5	4-2	70.6	1884	61-0	1891		
Kittyhawk.....	9	10	29.98	29.99	-.07	63.5	- 0.9	82	3	68	46	16	59	21	56	78	4.88	- 1.2	11,906	58	se.	9	19	4	8	3-8	68.3	1884	58-7	1876		
Raleigh.....	388	8	29.63	30.05	-.02	60.8	- 0.6	84	3	70	38	15	52	31	51	78	7.08	- 2.2	4,546	30	nw.	9	17	7	7	3-8	68.8	1894	55-8	1888		
Wilmington.....	78	24	29.95	30.03	-.07	65.2	- 0.5	87	3	73	45	16	57	27	56	79	4.58	- 0.6	6,306	38	sw.	9	19	6	6	3-1	69.8	1881	59-9	1876		
Charleston.....	53	24	30.00	30.05	-.05	68.4	- 0.7	86	3	75	50	16	62	25	58	77	4.12	- 0.2	6,470	48	se.	9	18	10	3	3-1	72.0	1881	62-0	1876		
Columbia.....	8	8	29.95	30.03	-.07	64.0	- 1.2	88	1	74	36	16	54	36	53	75	4.40	- 2.2	5	3,154	nw.	20	24	3	5	6-5	67.7	1892	59-7	1891		
Augusta.....	209	23	29.85	30.08	-.04	64.5	- 1.2	88	1	75	38	16	54	36	53	75	3.34	- 0.7	4	3,154	nw.	26	24	3	5	2-3	70.6	1881	59-7	1891		
Savannah.....	98	24	29.93	30.04	-.07	68.4	- 0.7	89	2	77	47	15	59	28	58	79	3.17	- 0.6	6,450	40	s.	9	20	6	5	3-7	74.4	1881	62-1	1876		
Jacksonville.....	43	24	29.96	30.01	-.06	71.5	- 0.9	90	2	80	53	31	63	28	61	78	3.24	- 2.4	6	6,024	aw.	62	24	8	9	4-2	74.7	1881	65-7	1876		
Florida Peninsula.																																
Jupiter.....	28	7	29.94	29.97	-.07	75.3	- 0.8	87	3	82	62	29	70	19	69	81	6.29	- 1.1	16	8,470	nw.	39	n.	23	10	13	8	4-9	77.3	1893	73-6	1891
Key West.....	22	24	29.95	29.97	-.07	77.7	- 1.3	87	1	82	70	25	74	15	70	78	6.91	- 1.6	14	9,316	ne.	35	nw.	23	10	12	9	5-3	80.3	1883	76-0	1891
Tampa.....	36	15	29.95	30.00	-.05	73.7	- 1.3	89	1	82	57	28	66	25	67	86	4.84	- 2.6	9	5,291	ne.	41	se.	9	15	7	5-7	73.3	1883	68-8	1889	
Titusville.....	44	8	29.96	30.00	-.04	73.8	- 0.7	87	1	80	56	31	68	23	66	80	3.63	- 2.1	9	10,302	ne.	48	n.	23	20	5	6	3-2	74.8	1887	69-4	1889
Eastern Gulf States.																																
Atlanta.....	1,131	17	28.88	30.07	-.07	62.1	- 0.1	85	2	72	41	14	52	28	48	67	2.62	- 0.3	5	7,013	nw.	30	w.	31	22	4	5	2-7	67.8	1884	56-5	1885
Pensacola.....	36	15	29.95	30.01	-.07	69.4	- 0.3	88	1	79	50	10	50	25	55	66	3.06	- 0.7	5	7,565	ne.	68	n.	8	25	3	3	2-7	73.8	1884	64-7	1885
Mobile.....	57	24	29.98	30.04	-.04	68.4	- 0.3	89	1	79	46	15	58	29	57	77	4.31	- 1.0	5	5,852	n.	48	n.	8	26	2	3	1-6	73.5	1881	62-7	1875
Montgomery.....	257	23	29.78	30.06	-.04	66.1	- 0.9	90	2	78	41	15	55	35	53	69	2.96	- 0.3	5	4,262	n.	24	n.	9	21	8	2	1-6	71.3	1884	60-4	1875
Meridian.....	358	23	29.67	30.05	-.03	63.0	- 0.9	89	1	78	41	15	58	41	49	74	0.34	- 1.4	2	3,363	ne.	26	n.	8	24	5	2	1-7	70.7	1884	60-4	1875
Vicksburg.....	254	24	29.77	30.03	-.08	66.6	- 0.4	90	1	78	41	15	58	41	49	74	1.56	- 1.4	3	4,404	e.	32	w.	3	27	4	0	1-1	71.3	1883	60-5	1875
New Orleans.....	54	24	29.97	30.03	-.03	70.8	- 0.1	88	1	79	47	30	62	26	56	67	0.89	- 3.5	3	5,926	ne.	48	nw.	8	26	2	3	1-4	75.4	1883	65-7	1885
Port Eads.....	249	24	29.76	30.03	-.06	67.3	- 1.1	89																								



TABLE I.—Climatological data for Weather Bureau Stations, October, 1894—Continued.

Districts and stations.	Elevation above sea level, feet.	Length of record, years.	Pressure, in inches.		Temperature of the air, in degrees Fahrenheit.						Humidity and precipitation.				Wind.				Mean temperature data since opening of station.													
			Mean pressure, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean minimum.	Date.	Mean maximum.	Greatest daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal.	Days with .01 or more.	Total movement, miles.	Prevailing direction.	Maximum velocity.			Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Highest for month.	Year.	Lowest for month.	Year.		
																					Miles per hour.	Direction.	Date.									
Up. Miss. Val.—Con.																																
Keokuk.....	613	24	29.28	29.94	-.13	56.0	+.2.0	83	16	66	31	14	46	31	42	57	1.28	-2.0	9	6,542	sw.	36	w.	25	13	13	5	3.9	61.6	1879	49.4	*
Cairo.....	359	24	29.63	30.02	-.07	56.2	+.0.5	85	17	70	38	14	50	32	45	66	1.47	-1.5	8	5,777	sw.	35	sw.	2	19	6	6	3.6	65.2	1879	53.7	1873
Springfield, Ill.....	644	16	29.28	29.98	-.11	55.8	+.0.8	82	20	66	32	14	46	31	42	67	0.85	-2.6	9	7,829	sw.	34	nw.	10	12	10	9	4.7	62.6	1879	50.4	1887
Hannibal.....	534	24	29.38	29.96	-.08	57.0	+.1.6	83	18	69	38	14	46	35	42	66	1.22	-1.1	10	7,612	w.	32	w.	25	13	8	10	5.0	62.8	1884	52.0	1873
Saint Louis.....	571	24	29.39	30.00	-.08	56.6	+.2.4	84	18	69	38	9	51	26	44	62	1.05	-1.1	10	8,762	sw.	37	sw.	3	16	8	7	3.5	62.8	1884	52.0	1873
Missouri Valley.																																
Columbia.....	.....	.....	.....	.....	.....	58.9	.....	89	17	72	28	9	46	40	.....	.....	0.98	.....	12	5,522	sw.	26	sw.	2	16	8	7	3.8	.....	.....	.....	.....
Kansas City.....	963	7	28.95	29.98	-.09	59.4	+.2.9	89	20	70	31	31	49	36	45	67	1.49	-2.2	11	6,286	sw.	36	sw.	20	18	8	5	2.9	59.4	1894	54.6	1888
Springfield, Mo.....	1,336	9	28.61	30.03	-.04	59.0	+.2.2	84	20	70	32	31	48	36	43	62	1.37	-2.0	8	8,348	sw.	42	sw.	2	19	8	4	2.7	61.2	1882	54.2	1888
Topeka.....	.....	8	.....	.....	.....	59.9	+.5.8	89	20	72	28	31	48	42	.....	.....	2.04	-1.0	10	.....	sw.	.....	.....	19	7	5	5	3.9	59.9	1894	49.1	1888
Omaha.....	1,123	24	28.74	29.94	-.14	55.0	+.2.8	84	16	66	31	31	44	33	39	63	2.94	+0.3	7	6,324	nw.	32	w.	25	16	6	9	4.2	61.5	1879	48.4	1873
Valentine.....	2,613	10	27.19	29.93	-.12	51.1	+.1.8	85	24	66	20	30	35	49	34	63	1.01	-0.3	4	5,704	nw.	48	n.	3	14	13	4	4.3	53.0	1886	44.6	1887
Sioux City.....	1,105	24	28.65	29.90	.....	52.6	.....	83	16	64	29	31	41	37	36	64	3.28	.....	9	9,557	nw.	50	nw.	25	13	9	9	4.7	.....	.....	.....	.....
Pierre.....	1,470	20	28.31	29.89	-.14	50.6	+.1.1	87	24	64	21	30	38	42	33	66	0.58	0.0	5	8,057	nw.	44	w.	2	16	7	8	4.1	54.1	1892	42.1	1893
Huron.....	1,310	14	28.47	29.89	-.14	48.1	+.2.0	82	24	62	25	30	35	42	35	71	2.22	+0.9	10	12,072	sw.	48	sw.	6	13	10	8	4.6	51.6	1892	42.2	1887
Northern Slope.																																
Havre.....	2,477	15	27.25	29.88	-.14	45.0	+.1.5	78	15	56	21	7	34	43	31	66	1.73	+1.2	9	7,123	w.	36	w.	24	11	13	7	4.9	49.0	1889	30.2	1881
Miles City.....	2,374	17	27.37	29.89	.....	47.4	+.1.3	77	16	60	23	7	35	42	32	65	1.86	-1.0	11	5,079	w.	36	sw.	24	17	6	8	4.4	51.1	1889	37.0	1883
Helena.....	4,108	15	25.79	30.01	-.05	46.8	+.1.8	74	15	56	16	7	38	36	28	53	0.68	-0.2	4	6,418	sw.	40	w.	24	10	11	10	5.1	50.7	1889	37.9	1881
Rapid City.....	3,280	9	26.53	29.92	-.12	50.6	+.1.8	82	16	64	24	8	38	52	28	51	0.16	-0.4	6	8,317	w.	44	nw.	9	16	9	6	4.2	51.7	1892	44.4	1883
Cheyenne.....	6,105	24	23.99	29.99	-.08	49.2	+.3.2	73	* 62	21	29	36	41	37	36	57	0.16	-0.6	3	9,797	nw.	54	w.	1	17	11	3	3.5	49.2	1894	39.3	1883
Lander.....	5,377	12	24.61	30.03	.....	45.8	+.2.8	74	16	62	15	28	45	48	24	51	0.03	-1.7	2	3,547	sw.	38	w.	25	16	11	4	3.8	46.7	1889	39.9	1881
North Platte.....	2,841	21	27.03	29.99	-.08	52.1	+.1.0	83	17	68	18	8	36	51	32	57	0.59	-0.5	4	7,781	nw.	40	nw.	3	16	14	1	3.4	55.2	1879	44.5	1877
Middle Slope.																																
Denver.....	5,287	23	24.74	29.99	-.07	54.0	+.3.3	80	6	68	21	29	40	46	21	31	0.19	-0.6	2	5,809	sw.	36	nw.	6	20	10	1	3.1	55.5	1884	45.7	1873
Pueblo.....	4,734	7	25.25	30.00	.....	54.4	+.2.4	84	6	71	20	29	38	50	21	33	0.23	-0.1	2	5,572	nw.	41	nw.	1	22	8	1	2.5	54.4	1894	50.6	1890
Concordia.....	1,410	10	28.47	29.96	-.10	58.0	+.3.2	86	16	72	28	31	44	41	40	63	1.10	-0.6	6	6,503	sw.	36	sw.	27	23	3	5	2.7	59.7	1886	50.9	1885
Dodge City.....	2,533	21	27.36	29.98	-.07	59.4	+.3.6	88	19	74	29	30	45	42	35	52	0.62	-0.6	3	9,139	sw.	45	sw.	27	25	5	1	2.3	59.6	1884	50.8	1883
Wichita.....	1,366	7	28.53	29.98	.....	61.4	+.3.7	85	20	74	33	30	49	38	42	58	2.01	-0.3	4	6,560	sw.	34	sw.	1	24	6	1	2.1	61.4	1894	56.4	1889
Oklahoma.....	1,239	24	28.71	30.02	.....	64.0	.....	92	19	76	35	30	52	38	46	62	1.84	.....	6	6,801	sw.	32	n.	7	29	2	0	1.5	.....	.....	.....	.....
Southern Slope.																																
Abilene.....	1,749	10	28.21	30.02	-.06	68.8	+.3.6	93	9	80	37	30	57	44	47	56	1.17	-1.9	4	7,305	sw.	35	sw.	1	16	15	0	2.8	68.8	1894	61.7	1887
Amarillo.....	3,691	24	26.26	30.01	.....	60.0	.....	81	9	72	32	29	48	36	34	48	0.39	.....	3	13,414	sw.	3	sw.	1	15	13	3	3.3	.....	.....	.....	.....
Southern Plateau.																																
El Paso.....	3,813	17	26.21	30.03	-.02	66.8	+.3.1	91	11	80	31	30	53	38	37	43	0.39	-0.8	3	7,280	nw.	50	sw.	27	19	11	1	2.5	67.8	1878	59.8	1882
Santa Fe.....	7,051	21	23.32	30.05	+.01	51.9	+.2.2	73	5	63	21	29	41	31	25	42	1.05	0.0	6	4,814	sw.	36	sw.	1	24	6	1	2.0	52.8	1875	45.7	1880
Tucson.....	2,390	10	27.48	29.93	.....	69.7	+.1.2	97	4	86	38	29	53	45	39	42	0.31	-0.1	5	3,167	nw.	24	sw.	19	23	6	2	2.3	71.9	1878	64.6	1882
Yuma.....	141	20	29.72	29.80	-.05	74.6	+.2.1	101	4	91	47	31	58	42	47	46	0.84	-0.5	1	3,635	sw.	34	n.	26	27	4	0	1.1	77.0	1876	66.7	1883
Middle Plateau.																																
Carson City.....	4,720	7	25.33	30.07	.....	51.6	+.1.5	77	16	66	22	29	37	42	27	42	0.43	-0.2	4	6,914	sw.	42	w.	20	18	4	9	3.9	53.0	1885	42.5	1881
Winemucca.....	4,340	16	25.69	30.05	-.01	50.0	+.2.0	76	16	65	22	30	35	45	24	41	0.42	-0.1	7	6,914	sw.	42	w.	20	18	4	9	3.9	53.0	1885	42.5	1881
Salt Lake City.....	4,345	21	25.69	30.09	-.00	53.2	+.2.0	77	17	64	28	28	42	34	33	51	1.01	-0.7	6	4,366	sw.	30	sw.	18	19	5	7	3.2	59.1	1875	46.1	1883
Northern Plateau.																																
Baker City.....	3,430	6	26.45	30.00	.....	47.1	.....	75	16	58	25	7	35	40	32	62	1.13	.....	11	3,727	sw.	26	nw.	5	15	11	1	5.5	51.1	1889	41.4	1893
Idaho Falls.....	4,742	5	25.25	30.07	.....	45.6	.....	75	16	58	25	7	35	40	32	62	1.13	.....	8	6,519	sw.	36	sw.	5	11	6	14	5.5	47.1	1892	40.0	1891
Spokane.....	1,930	14	27.95	30.02	-.04	48.6	+.1.3	74	4	58	30	20	39	34	35	66	1.43	-0.5	14	4,919	sw											

TABLE I a.—Temperature of the wet-bulb thermometer, October, 1894.

Number.	Station.	8 A. M.			8 P. M.			Number.	Station.	8 A. M.			8 P. M.			
		Max.	Min.	Mean.	Max.	Min.	Mean.			Max.	Min.	Mean.	Max.	Min.	Mean.	
New England.																
1	Eastport, Me.	57	36	44	54	34	46	70	Chicago, Ill.	60	30	45	62	38	48	
2	Portland, Me.	58	36	46	57	33	47	71	Milwaukee, Wis.	55	31	43	57	36	46	
3	Northfield, Vt.	54	32	43	56	28	46	72	Green Bay, Wis.	60	30	43	58	34	46	
4	Boston, Mass.	61	36	48	60	35	49	73	Duluth, Minn.	59	32	41	50	36	44	
5	Nantucket, Mass.	66	38	51	62	38	51	North Dakota.								
6	Woods Holl, Mass.	66	38	51	66	38	52	74	Moorhead, Minn.	47	24	36	63	30	44	
7	Block Island, R. I.	66	38	52	67	41	53	75	St. Vincent, Minn.	45	22	33	52	26	40	
8	New Haven, Conn.	61	40	48	65	36	50	76	Bismarck, N. Dak.	46	21	34	49	33	41	
9	New London, Conn.	63	38	50	66	38	51	77	Williston, N. Dak.	40	23	32	48	31	39	
Middle Atlantic States.																
10	Albany, N. Y.	60	38	47	64	37	49	78	Upper Mississippi Valley.							
11	New York, N. Y.	60	36	50	68	40	52	79	St. Paul, Minn.	56	31	41	63	36	46	
12	Harrisburg, Pa.	60	36	49	62	38	52	80	La Crosse, Wis.	58	28	43	65	37	48	
13	Philadelphia, Pa.	63	37	50	69	39	52	81	Davenport, Iowa.	63	34	44	61	38	48	
14	Atlantic City, N. J.	67	36	53	67	41	54	82	Des Moines, Iowa.	58	31	42	66	37	48	
15	Baltimore, Md.	65	34	50	68	37	52	83	Keokuk, Iowa.	64	34	46	62	38	49	
16	Washington, D. C.	65	35	50	68	38	52	84	Cairo, Ill.	64	38	48	72	40	54	
17	Lynchburg, Va.	64	40	50	66	39	54	85	Springfield, Ill.	61	32	45	64	38	50	
18	Norfolk, Va.	71	39	56	72	46	58	86	Hannibal, Mo.	64	30	46	64	39	50	
South Atlantic States.																
19	Charlotte, N. C.	68	39	52	68	41	55	87	St. Louis, Mo.	64	35	48	66	40	53	
20	Hatteras, N. C.	73	47	61	72	46	61	88	Missouri Valley.							
21	Kittyhawk, N. C.	73	41	59	72	42	60	89	Columbia, Mo.	64	31	47	68	36	54	
22	Raleigh, N. C.	70	38	53	70	41	56	90	Kansas City, Mo.	63	30	46	66	35	52	
23	Wilmington, N. C.	74	41	58	73	45	60	91	Springfield, Mo.	61	30	43	63	34	49	
24	Charleston, S. C.	75	44	60	74	48	62	92	Omaha, Nebr.	61	30	43	63	34	49	
25	Augusta, Ga.	70	40	54	71	48	59	93	Valentine, Nebr.	48	20	36	60	35	46	
26	Savannah, Ga.	72	46	60	73	49	63	94	Sioux City, Iowa.	58	30	40	61	32	47	
27	Jacksonville, Fla.	75	50	63	76	53	65	95	Pierre, S. Dak.	48	20	37	53	36	45	
Florida Peninsula.																
28	Jupiter, Fla.	78	59	70	78	60	71	96	Huron, S. Dak.	51	24	38	56	34	44	
29	Key West, Fla.	78	65	72	78	65	73	97	Northern Slope.							
30	Tampa, Fla.	77	57	68	77	56	69	98	Havre, Mont.	45	24	34	51	28	42	
31	Titusville, Fla.	77	55	69	76	54	68	99	Miles City, Mont.	46	23	35	55	32	43	
Eastern Gulf States.																
32	Atlanta, Ga.	65	38	51	70	43	56	100	Helena, Mont.	51	16	34	52	28	41	
33	Pensacola, Fla.	73	46	58	74	49	63	101	Rapid City, S. Dak.	48	22	36	55	32	42	
34	Mobile, Ala.	72	47	57	74	48	63	102	Cheyenne, Wyo.	46	22	34	48	26	38	
35	Montgomery, Ala.	69	42	54	72	47	60	103	Lander, Wyo.	44	14	30	49	26	40	
36	Meridian, Miss.	69	37	50	70	43	57	104	North Platte, Nebr.	53	15	35	54	32	46	
37	Vicksburg, Miss.	68	39	53	70	45	58	105	Middle Slope.							
38	New Orleans, La.	72	45	60	74	46	63	106	Denver, Colo.	46	20	34	56	30	45	
Western Gulf States.																
39	Shreveport, La.	68	36	54	75	45	60	107	Pueblo, Colo.	47	15	33	51	31	45	
40	Fort Smith, Ark.	65	39	49	70	42	58	108	Concordia, Kans.	56	28	43	65	38	51	
41	Little Rock, Ark.	65	38	50	72	39	58	109	Dodge City, Kans.	57	26	41	60	33	50	
42	Corpus Christi, Tex.	78	40	67	80	49	71	110	Wichita, Kans.	60	30	46	64	37	52	
43	Galveston, Tex.	79	46	66	78	49	67	111	Oklahoma, Okla.	62	32	49	71	38	56	
44	Palestine, Tex.	72	36	57	75	44	62	112	Southern Slope.							
45	San Antonio, Tex.	72	37	58	72	50	64	113	Abilene, Tex.	66	33	53	70	43	58	
Ohio Valley and Tennessee.																
46	Chattanooga, Tenn.	65	35	49	69	42	54	114	Amarillo, Tex.	57	27	43	59	33	49	
47	Knoxville, Tenn.	63	35	48	68	39	53	115	Southern Plateau.							
48	Memphis, Tenn.	67	37	51	69	42	56	116	El Paso, Tex.	59	26	47	62	39	54	
49	Nashville, Tenn.	66	36	48	65	42	53	117	Santa Fe, N. Mex.	45	21	36	58	30	43	
50	Lexington, Ky.	60	35	47	63	38	50	118	Tucson, Ariz.	62	35	47	65	48	57	
51	Louisville, Ky.	62	34	46	65	40	51	119	Yuma, Ariz.	64	44	54	71	50	63	
52	Indianapolis, Ind.	62	34	46	65	39	50	120	Carson City, Nev.	46	21	35	53	37	46	
53	Cincinnati, Ohio	60	34	47	66	39	50	121	Middle Plateau.							
54	Columbus, Ohio	59	31	46	66	37	49	122	Winnemucca, Nev.	44	21	33	56	33	46	
55	Pittsburg, Pa.	62	36	48	61	38	51	123	Salt Lake City, Utah	49	26	40	54	34	47	
56	Parkersburg, W. Va.	64	32	46	68	42	54	124	Northern Plateau.							
Lower Lake Region.																
57	Buffalo, N. Y.	64	33	48	62	34	49	125	Baker City, Oreg.	45	25	35	57	35	44	
58	Oswego, N. Y.	55	34	47	58	36	49	126	Idaho Falls, Idaho	47	18	32	50	31	43	
59	Rochester, N. Y.	58	33	47	59	34	48	127	Spokane, Wash.	52	39	39	59	40	45	
60	Erie, Pa.	65	37	48	65	35	50	128	Walla Walla, Wash.	57	33	45	67	41	51	
61	Cleveland, Ohio	63	34	47	66	38	50	129	North Pacific Coast Region.							
62	Sandusky, Ohio	62	31	46	66	38	50	130	Fort Canby, Wash.	56	42	48	58	44	50	
63	Toledo, Ohio	61	32	45	66	35	48	131	Port Angeles, Wash.	54	35	42	56	42	47	
64	Detroit, Mich.	61	30	45	64	33	48	132	Seattle, Wash.	58	36	46	61	41	49	
Upper Lake Region.																
65	Alpena, Mich.	56	30	43	59	34	46	133	Tatoosh Island, Wash.	55	42	47	56	41	47	
66	Grand Haven, Mich.	59	30	45	61	34	48	134	Portland, Oreg.	58	40	46	64	44	51	
67	Marquette, Mich.	57	32	44	55	33	45	135	Roseburg, Oreg.	55	34	46	64	44	54	
68	Port Huron, Mich.	61	27	44	60	33	47	136	Middle Pacific Coast Region.							
69	Sault Ste. Marie, Mich.	51	29	42	54	32	47	137	Eureka, Cal.	55	43	50	60	48	53	



TABLE II.—Meteorological record of voluntary and other co-operating observers, October, 1894.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Alabama.					Arkansas—Cont'd.				
Alco	90	37	65.6		Conway	84	34	60.0	1.69
Ashville	87	34	60.4		Corning	88	27	58.0	1.50
Bermuda	88	36	64.3	4.72	Dallas	91	41	63.6	3.79
Brewton	95	32	65.7	0.30	Dardanelle	87	30	61.3	0.55
Carrollton	84	39	63.0	0.74	Fayetteville	87	30	61.3	2.58
Citronelle	84	49	67.8	5.00	Forrest	88	33	64.0	1.41
Claiborne Landing				5.90	Fulton				0.97
Collinsville	89	46	67.6	2.75	Helena				2.04
Cordeiro				1.40	Helena b	96	34	66.5	1.90
Daphne	94	37	66.6	5.97	Hot Springs a	93	30	64.1	1.90
Decatur	94	30	60.6	1.14	Hot Springs b				2.90
Eufula a	89	43	66.8	4.77	Hot Springs (near)				2.40
Eufula c				5.04	Keesee Ferry	89	24	59.9	2.34
Evergreen	91	36	64.8	5.71	Kirby	87	29	63.8	0.50
Florence a				0.61	Lonoke	84	35	64.8	1.81
Florence b	85	33	59.5	0.55	Luna Landing	84	31	64.3	1.00
Fort Deposit	89	41	65.7	5.91	Malvern	90	35	63.7	1.31
Gadsden	87	33	62.4	0.90	Monticello	89	38	65.3	0.92
Greensboro	88	41	64.6	0.65	Mount Ida				2.28
Healing Springs	90	33	62.6	0.48	Mount Nebo	79	37	60.2	0.63
Highland Home	88	43	66.4	6.15	New Gascony	85	40	63.3	1.76
Jasper	86			1.00	Newport a				1.30
Livingston	89	35	63.8	0.33	Newport b	88	29	62.6	1.21
Lock No. 4				0.65	Newport c	88	28	60.6	1.25
Madison Station	89	33	61.7	1.41	Osceola	88	36	61.8	0.50
Maple Grove	88	30	59.4	0.66	Ozark	87	33	63.6	1.65
Marion	86	42	66.4	0.63	Pine Bluff	90	32	65.0	2.05
Mount Willing	89	42	64.2	5.22	Pocahontas	86	30	58.4	1.97
Newbern	88	40	61.4	0.57	Prescott	92	31	66.2	0.90
Newburg	88	30	62.0	0.61	Rison	90	20	62.0	0.38
Newton	86	41	64.0	5.89	Russellville	86	28	61.4	0.72
On-onto	88	30	59.3	0.45	Stuttgart	86	34	61.6	3.62
Opelika	88	32	65.2	3.17	Texarkana	90	31	68.4	0.55
Oxanna	84	34	62.9	1.72	Washington	87	34	65.2	0.68
Pine Apple	91	33	64.2	1.62	Winslow	82	35	59.4	2.76
Pushmataha		34		0.11	California.				
Rock Mills	88	36	61.8	3.43	Adin	83	27	52.0	1.93
Scottsboro	87	36	63.6	1.37	Ager	88	32	54.6	1.15
Selma				1.67	Agnew	90	39	60.6	1.47
Sturdevant				0.39	Anaheim	96	47	65.1	0.00
Tallahassee Falls				4.56	Antioch	88	46	63.0	0.63
Tuscaloosa	89	35	62.3	0.97	Aptos	85	40	59.0	2.93
Tusculum	87	34	62.2	0.53	Arlington Heights	100	43	66.8	0.07
Union	89	34	65.0	0.63	Athlone	85	45	64.5	0.66
Union Springs	90	42	65.0	6.19	Auburn	90	50	64.7	3.87
Uniontown	90	43	67.0	0.55	Bakersfield	90	44	67.3	0.03
Valley Head	86	31	60.6	1.54	Barstow	96	39	70.4	0.00
Wetumpka				3.23	Bear Valley				6.38
Wilsonville				1.67	Beaumont	99	45	67.9	0.00
Alaska.					Belmont	72	50	61.6	
Killisnoo	53	28	39.7	6.15	Berendo	94	50	68.4	0.40
Arizona.					Berkeley	86	46	59.1	3.29
Antelope Valley				1.80	Bethany	88	46	63.3	0.56
Arix Canal Co. Dam	102	40	71.9	0.53	Bishop Creek	90	46	66.0	0.00
Benson a	93	54	64.5	0.00	Boca	90	25	45.8	0.61
Benson b	96	33	64.8	0.82	Borden	96	50	68.1	0.42
Blaine	85	40	63.8	1.47	Boulder Creek	86	40	60.0	6.70
Buckeye	102	40	71.0	1.30	Brentwood	88	44	60.8	1.01
Calabasas	91	36	63.8	1.15	Brighton	85	50	66.4	1.03
Casa Grande	98	51	74.0	0.13	Byron	88	39	60.5	1.02
Dragon Summit	94	48	72.2	1.02	Caliente	90	48	63.8	0.20
Eagle Pass	94	36	51.3	1.02	Calistoga	92	42	61.2	2.65
Farley's Camp				1.50	C. Mendocino L. H.	80	40	60.9	3.78
Fort Apache	86	30	57.5	2.47	Capitola	92	40	59.9	
Fort Grant	91	34	64.1	1.10	Castroville	82	47	59.1	1.16
Fort Huachuca	89	33	63.6	0.58	Cedarville	79	27	50.6	1.34
Gila Bend	102	55	70.0	0.60	Centerville	96	50	63.2	1.49
Globe	92	41	67.8	0.87	Chico	96	42	64.0	2.64
Holbrook	84	27	56.1	0.83	Cisco	72	30	47.2	
Keams Canyon	84	31	52.9	0.73	Claremont	92	44	64.3	0.00
Maricopa	110	45	77.2	0.50	Cloverdale	95	45	65.0	3.27
Mount Huachuca	86	39	64.3	1.13	Colfax	96	42	57.2	5.75
Natural Bridge				2.06	Colton	95	35	58.5	0.15
Navajo	75	42	57.7		Colusa	90	41	63.1	0.87
Oracle	88	38	66.5	1.44	Corning	91	47	65.1	0.85
Oro				0.79	Crescent City	71	36	54.4	5.66
Pantano	85	48	64.4	1.34	Crescent City L. H.				5.30
Parker	107	39	73.0	1.62	Crofton	95	50	67.4	0.08
Peoria	97	44	71.9	0.77	Davisville	89	45	65.8	1.91
Phoenix	95	44	70.8	0.77	Davisville b	94	45	65.9	1.07
Reymert	96	46	71.8	0.51	Deep Creek				0.30
Rye	95	32	66.0	1.22	Delano	92	42	66.3	0.16
San Carlos	100	41	66.6	1.05	Delta	91	39	60.4	7.33
San Simon	95	46	68.7	0.27	Dinuba	84	50	65.6	0.99
Show Low				1.60	Downey	100	46	67.4	0.59
Signal	97	45	65.2	0.80	Dry Creek				5.89
Sulphur Spr'g Val				0.70	Drytown	90	40	61.0	2.67
Texas Hill	110	50	76.6	0.10	Dunnigan	94	44	63.5	1.76
Tucson b	90	50	67.9	0.04	Dunsmuir	78	40	53.4	9.65
Tucson c	97	39	70.1	0.46	East Brother L. H.				2.10
Walnut Ranch	84	36	60.8	1.82	Edgewood	78	31	51.3	1.75
Whipple Barracks	86	26	56.1	1.37	Edmonton	81	30	49.9	6.54
Wilcox				0.60	Eldorado	94	47	63.7	3.52
Yuma	90	45	63.3	0.78	Elk Grove	95	50	68.3	
	98	59	77.0	1.25	Elmira	92	40	62.1	3.17
					El Verano	87	45	60.5	3.00
Arkansas.					Emigrant Gap	71	30	51.3	
Arkadelphia				1.00	Escondido	95	38	64.5	
Arkansas City				0.75	Evergreen				1.26
Bee Branch	92	39	62.9	0.10	Exeter	91	48	65.8	0.26
Blanchard Springs	90	30	63.0	1.68	Fall Brook	98	45	60.7	0.06
Brinkley	92	34	64.6	2.24	Farmington	89	40	58.3	1.51
Camden a				1.19	Felton	96	36	59.0	7.11
Camden b	92	39	63.2	1.22					

Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>California—Cont'd.</i>	°	°	°	<i>Ins.</i>	<i>California—Cont'd.</i>	°	°	°	<i>Ins.</i>
Fernando**	96	42	65.1	0.02	Oakland b**	82	48	59.0	2.54
Florence**	85	54	60.7	0.00	Ogilby	101	61	64.4	0.00
Florin**	93	49	60.9	1.74	Ontario a**	95	52	63.3	0.05
Folsom City a**	92	48	65.7	3.41	Ontario b**	100	43	68.0	0.03
Folsom City b**	92	43	62.9	2.76	Orland	91	45	64.2	0.72
Fordey Dam †	97	44	62.3	0.10	Ormonde	94	46	66.7	4.93
Fort Ross	97	44	62.3	0.10	Oroville a**	94	46	66.7	2.40
Freemontville**	97	44	62.3	0.10	Oroville b	93	42	66.3	2.40
Fresno**	90	54	66.1	0.75	Pajaro	95	34	57.9	2.00
Fruto**	90	47	64.9	0.80	Palermo †	91	37	62.4	2.46
Galt**	92	44	63.6	1.11	Palm Springs**	101	55	76.4	0.00
Georgetown †	84	40	59.0	6.22	Pasadena †	94	44	65.2	0.02
Gilroy**	84	47	61.2	1.26	Paso Robles a**	93	37	60.6	0.88
Girard**	80	44	56.5	0.24	Paso Robles b	88	34	58.3	0.33
Glen Ellen**	90	38	59.3	6.55	Petaluma**	90	45	60.9	1.72
Gorman's Station †	90	47	62.7	0.1	Piedras Blancas L.H.	90	45	60.9	1.72
Goshen**	90	47	62.7	T.	Pigeon Point L. H.	90	45	60.9	1.46
Grass Valley a	90	47	62.7	0.1	Pilot Creek	90	45	60.9	6.56
Grass Valley	90	47	62.7	0.1	Placerville a**	86	45	61.8	4.25
Greenville**†	88	20	48.0	2.95	Placerville b	83	33	55.2	3.93
Guinda	90	47	62.7	0.1	Placerville c**	100	38	60.9	1.42
Haywards**	80	43	57.5	2.48	Placerville d	89	34	58.3	1.31
Healdsburg**	90	40	60.8	2.43	Pt. Ano Nuevo L. H.	90	45	60.9	1.69
Hendersons Ranch.	90	40	60.8	0.00	Point Arena L. H.	90	45	60.9	2.20
Hollister**	92	47	61.9	1.11	Point Bonita L. H.	90	45	60.9	3.41
Hornbrook**	82	30	52.8	1.30	Pt. Conception L. H.	90	45	60.9	0.23
Hueneme	90	47	62.7	0.13	Point Fermin L. H.	90	45	60.9	0.16
Humboldt L. H.	90	47	62.7	3.53	Pt. Hueneme L. H.	90	45	60.9	0.66
Huron**	90	50	65.0	0.28	Point Lobos	83	50	57.0	1.36
Hydesville †	72	38	54.0	2.42	Point Montara L. H.	90	45	60.9	1.81
Independence †	88	32	61.8	0.00	Point Pinos L. H.	90	45	60.9	0.96
Indio a**	105	56	79.2	0.00	Point Reyes L. H.	90	45	60.9	2.42
Indio b**	88	40	63.1	2.08	Point Sur L. H.	90	45	60.9	1.10
Iowa Hill**	90	45	61.2	4.06	Pomona	95	42	64.2	0.00
Jackson	85	40	58.0	3.68	Pomona (near)	99	46	67.4	0.04
Jolon	90	47	62.7	0.75	Porterville**	93	44	66.2	0.15
Julian †	95	32	59.6	T.	Port Los Angeles**	75	53	62.0	0.93
Keeler**	94	43	68.0	0.00	Poway	92	42	59.7	T.
Keene**	87	42	59.6	0.05	Puente**	97	48	66.5	0.00
Kennedy Gold	90	47	62.7	0.1	Ravenna**	92	39	63.7	0.00
Mine	88	40	61.0	3.69	Red Bluff**	90	50	65.6	0.85
Kernville	90	47	62.7	0.00	Redding a**	93	45	61.0	5.85
King City**	98	40	63.4	0.41	Redding b†	93	42	63.2	4.15
Kingsburg**	95	45	67.7	0.40	Redlands	90	47	62.7	0.07
Knights Landing**	90	40	60.4	1.02	Redlands b**	95	52	67.1	0.08
Kono Tayee	82	45	60.8	1.22	Redley (near)**	90	44	65.7	0.40
Lagrange**	95	42	66.0	0.85	Repressa	84	38	59.6	2.75
La Porte**†	78	31	48.2	3.87	Rio Vista	89	41	62.4	1.91
Lathrop**	90	44	63.2	8.18	Riverside†	104	37	64.8	0.06
Laurel**	92	45	60.2	4.84	Rocklin**	94	49	64.8	2.05
Lemoore**	92	41	64.0	0.20	Roe Island L. H.	90	45	60.9	0.78
Lick Observatory†	79	33	55.5	2.98	Rosewood**	93	38	58.9	1.42
Lime Point L. H.	90	47	62.7	1.93	Sacramento a	84	39	59.4	1.25
Little Bear Valley.	90	47	62.7	0.38	Sacramento b**	87	48	62.4	0.42
L. Bear Val. (near).	90	47	62.7	0.29	Sacramento c**	83	43	60.8	1.19
Livermore**	88	42	60.7	1.15	Salinas	92	44	56.3	1.06
Livingston**	93	46	66.0	0.67	Salton**	110	56	82.7	T.
Lodi	87	42	62.0	2.14	San Ardo a**	95	39	58.7	0.25
Long Beach**	94	45	65.0	0.1	San Bernardino †	96	38	64.6	0.15
Los Alamos	90	47	62.7	0.81	San Gabriel**	88	47	66.8	0.00
Los Angeles**	95	48	66.6	0.73	Sanger Junction**	95	50	69.5	0.42
Los Banos**	88	48	61.3	0.46	San Jacinto †	100	36	65.5	0.04
Los Gatos a**	95	45	62.9	2.75	San Jose a**	88	44	61.0	1.32
Los Gatos b	90	42	59.4	2.87	San Jose b	87	35	57.4	1.00
L. Holcomb Valley.	90	47	62.7	0.45	San Leandro**	90	50	62.4	2.69
Mammoth Tank**	100	50	76.9	T.	San Luis L. H.	90	45	60.9	1.21
Manzana	90	37	62.0	0.00	San Luis Obispo a	90	45	60.9	1.37
Mare Island L. H.	90	47	62.7	1.00	San Mateo**	87	49	62.3	3.03
Mariposa**	90	38	59.6	1.96	San Miguel**	91	41	61.3	0.69
Martinez**	85	42	57.5	1.65	San Miguel Island †	90	50	61.2	0.11
Marysville**	86	47	61.9	1.91	San Pedro**	90	54	65.8	0.00
Mendota**	89	47	61.8	0.09	San Rafael †	86	28	54.4	4.24
Menlo Park**	88	42	61.2	1.51	Santa Ana**	90	50	68.7	0.00
Merced**	90	43	62.7	0.88	Santa Barbara b**	90	58	65.7	0.78
Middletown**†	94	37	58.5	3.18	Santa Barbara L. H.	90	45	60.9	0.97
Mills College	90	47	62.7	2.88	Santa Clara a**	86	32	59.3	2.07
Milton**	89	45	62.0	1.63	Santa Clara b	96	38	64.6	1.16
Milton (near)**	93	44	64.2	1.77	Santa Cruz a**	94	48	61.9	2.95
Modesto**	93	55	68.0	0.61	Santa Cruz b†	94	42	61.4	3.59
Mohave**	90	44	57.9	0.00	Santa Cruz L. H.	90	45	60.9	2.34
Mokelumne Hill**	90	46	60.2	4.34	Santa Margarita**	90	34	58.7	0.73
Montague**	84	33	61.6	1.00	Santa Maria**	96	46	64.8	6.68
Monterey**	84	40	57.9	1.64	Santa Monica**	81	46	63.3	0.10
Monterey (Hotel	90	47	62.7	0.1	Santa Paula a**	90	48	62.0	0.30
del Monte)**	82	40	57.5	0.00	Santa Paula b†	95	40	60.0	2.55
Morses House	90	47	62.7	0.47	Santa Rosa**	87	44	60.0	0.24
Mount Frazier.	90	47	62.7	0.00	Santicy†	90	45	60.9	0.00
Mount Glenwood**	80	48	66.7	2.12	Selma**	92	45	64.3	0.35
Napa a**	93	40	59.3	2.48	Shasta Springs †	81	30	53.2	7.51
Napa b	91	45	61.9	1.93	Shingle Springs**	81	47	59.5	3.55
National City †	95	46	64.3	0.04	Sims**	91	51	64.7	1.65
Needles †	99	48	73.5	0.60	Sisson**	79	30	55.3	3.65
Neenach**	93	32	62.8	0.00	Sneddens Ranch	90	45	60.9	0.00
Nevada City †	81	35	55.3	4.83	Soledad**	92	42	60.6	0.71
New Almaden**	91	49	62.2	1.69	SE. Farallone L. H.	90	45	60.9	1.65
Newark**	89	48	63.4	1.56	South Vallejo**	79	50	59.9	1.49
Newcastle a†	88	40	61.8	3.28	Spadra**	100	45	66.0	0.00
Newcastle b**	98	43	65.7	2.88	Squirrel Inn	90	45	60.9	0.34
Newhall**	100	42	64.3	0.00	Stanford University	88	43	59.9	1.19
Newman**	88	50	64.2	0.35	Stockton a	87	44	61.7	1.32
Niles**	84	50	61.8	2.80	Stockton b**	95	40	58.8	3.60
Norwalk**	96	50	63.6	0.00	Suisun City**	94	48	63.9	1.28
Oakdale a**	91	38	60.8	1.16	Summerdale †	75	31	45.9	2.63
Oakdale b**	94	44	63.0	1.23	Summit**	65	32	45.9	1.96
Oakland a	84	45	59.0	3.64	Susanville**†	77	32	39.9	1.96



Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
California—Cont'd.					Colorado—Cont'd.				
Tehachapi a <sup>1</sup>	80	50	63.8	0.00	Thon t	82	14	52.2	0.11
Tehama a <sup>1</sup>	96	50	68.2	2.37	T. S. Ranch t				1.33
Templeton a <sup>1</sup>	92	52	57.0	1.09	Twin Lakes				1.37
Towles a <sup>1</sup>	82	38	55.2	5.60	Vernon t	94	29	61.2	0.10
Tracy a <sup>1</sup>	82	45	64.4	0.43	Vilas				0.29
Traver a <sup>1</sup>	78	36	60.1		Walton t				T.
Trinidad L. H.				2.89	Watkins a <sup>1</sup>	85	35	55.2	
Tropico a <sup>1</sup>	99	48	64.2	0.00	Yuma				0.00
Truckee a <sup>1</sup>	70	34	46.7	1.12	Connecticut.				
Tulare a <sup>1</sup>	92	40	62.7	0.25	Bridgeport a <sup>1</sup>	70	37	53.0	7.25
Tulare b				0.11	Canton	74	29	51.6	6.40
Tunnel No. 2	98	36	64.8	0.18	Colchester	72	33	52.5	5.83
Turlock a <sup>1</sup>	90	48	67.7	1.20	Colebrook River				5.38
Turlock b t	91	39	61.6	0.63	Falls Village				4.06
Ukiah t	90	35	58.0	2.45	Greenfield Hill				5.61
Upper Lake	96	38	66.8	2.05	Hartford b				6.50
Vacaville a <sup>1</sup>	94	46	64.1	3.33	Hartford c	68	34	52.4	
Vacaville b <sup>1</sup>	90	43	64.9	3.50	Lake Konomoc				6.77
Valley Springs a <sup>1</sup>	87	47	65.4	2.04	Lebanon				5.75
Ventura t	90	44	61.0	0.10	Middletown	71	32	53.1	8.00
Vina a <sup>1</sup>	91	47	65.3	1.13	New Hartford a <sup>1</sup>	78	32	51.7	6.46
Volcano Springs a <sup>1</sup>	100	74	90.2	1.08	New Hartford b				6.46
Walnut Creek	92	39	60.1	2.23	N. Grosvenor Dale	71	29	49.8	3.68
Wenrich Ranch				0.00	Norwalk	70	29	52.0	3.86
West Butte				1.06	Southington a <sup>1</sup>	70	33	51.1	6.40
West Point t				4.73	South Manchester				5.42
Westley a <sup>1</sup>	86	47	64.5	0.65	Storrs	72	33	50.9	4.16
Wheatland	93	40	63.6	1.62	Thompson a <sup>1</sup>	75	33	49.6	
Whittier a <sup>1</sup>	100	57	70.8	T.	Voluntown t	70	28	52.0	5.64
Williams a <sup>1</sup>	92	46	65.4	0.91	Wallingford t				7.07
Willows a <sup>1</sup>	92	48	64.4	0.98	Waterbury	73	30	52.8	4.91
Wilmington a <sup>1</sup>	80	51	67.4	T.	West Simsbury				6.34
Winters a <sup>1</sup>	90	37	61.3	1.39	Windsor	67	33	51.4	4.85
Wire Bridge a <sup>1</sup>	88	41	61.4	2.60	Delaware.				
Woodland a <sup>1</sup>	93	44	66.8	1.01	Dover t	82	38	57.0	4.15
Yerba Buena L. H.				1.30	Kirkwood a <sup>1</sup>				5.74
Yreka t	87	28	53.6	1.60	Millford	85	34	59.7	5.63
Yuba City a <sup>1</sup>	82	50	64.4	1.99	Millboro	85	32	57.2	5.65
Colorado.					Newark	81	31	55.5	3.56
Abbott				T.	Seaford t	82	36	57.4	4.40
Alma t	60	10	36.9	0.21	Seaford t	84	35	58.8	4.17
Antlers t				0.93	Wilmington t				
Avoca				0.00	District of Columbia.				
Box Elder				0.06	Dist'g Reserv'r a <sup>1</sup>	79	38	57.2	3.58
Brookridge t	68	7	37.1	1.35	Rec'g Reserv'r a <sup>1</sup>	81	37	57.3	3.86
Byers a <sup>1</sup>	79	30	47.5		West Washington	84	32	59.1	T.
Canyon t	86	22	55.4	0.00	Florida.				
Castle Rock t	85	13	51.1	0.20	Amelia t	88	44	66.8	1.00
Climax a <sup>1</sup>	36	-1	29.6	2.00	Archer	91	44	71.4	4.26
Collbran				1.24	Avon Park t	91	52	74.8	3.15
Como (near) t	63	10	39.2	0.07	Brookville t	85	48	71.4	4.26
Cope t	93	25	56.8	0.13	Clermont t	89	57	73.2	3.99
Crook				T.	Eustis t	90	52	73.0	3.76
Deer Trail a <sup>1</sup>	80	31	59.4		Federal Point t	97	52	71.0	3.86
Delta t	80	20	49.0	0.87	Fort Meade t	88	50	72.4	2.70
Divide Ex. Station.	72	10	40.6	0.31	Gainesville t	86	49	71.1	1.18
Downing t	83	30	55.0	0.00	Gramercy t	80	53	73.0	2.44
Dumont	74	20	48.0	0.25	Green Cove Sp'gs t	86	40	68.2	3.40
Durango t	72	24	49.2	0.78	Homeland t	87	50	71.2	3.95
First View a <sup>1</sup>	85	30	52.6		Hypoluxo a <sup>1</sup>	89	65	77.6	4.12
Fleming				0.09	Klamath t	92	53	73.6	4.30
Fort Collins t	81	19	51.3		Lake City t	97	50	71.8	3.53
Glen Eyrie t	71	19	51.6	0.09	Manatee t	80	52	72.4	2.79
Gold Hill a <sup>1</sup>	71	20	48.7	0.05	Merritts Island t	88	59	76.0	2.14
Grand Junction t	77	28	52.9	0.97	Moseley Hall t	80	48	70.5	7.36
Greely				1.39	Mullet Key t	84	64	74.0	0.56
Holly t				0.01	Myers t	88	56	74.8	4.58
Hugo a <sup>1</sup>	85	28	60.8		New Smyrna t	86	52	71.8	4.44
Hugo (near) t	79	17	47.2	0.05	Oak Hill a <sup>1</sup>	88	59	76.6	
Husted t	84	10	50.8	0.28	Ocala a <sup>1</sup>	87	54	74.0	3.26
Julesburg t	83	17	51.6	0.10	Orange City t	91	49	74.5	2.04
Kit Carson a <sup>1</sup>	90	30	56.4		Orange Park	86	47	70.2	3.74
La Jara t	77	11	49.9	0.10	Orlando t	91	47	74.0	4.70
Lake Moraine	60	14	40.8	0.10	Plant City t	92	51	73.2	3.80
Lae Animas t	88	19	54.2	0.00	St. Francis B'ks	84	52	71.5	3.70
Lavender t	72	13	47.7	1.70	Tarpon Springs t	90	53	73.0	2.81
Lay a <sup>1</sup>	79	35	54.8		Georgia.				
Le Roy a <sup>1</sup>	83	24	52.1	0.08	Adairsville t	88	34	61.0	1.60
Leslie				0.11	Alapaha t	89	43	67.2	6.32
Loveland				0.00	Albany t	93	40	66.4	5.73
Meeker t	75	15	45.2	1.97	Americus t	92	36	65.7	4.02
Minneapolis t	90	36	58.0	0.00	Athens a	83	37	60.4	4.12
Monte Vista	70	13	45.4	0.00	Athens b t	86	33	61.4	3.63
Moraine t	67	19	44.9	0.56	Bainbridge a t	90	41	67.2	3.56
Pagoda (near) t	73	16	43.2	1.90	Bainbridge b t				7.03
Paonia				2.73	Blakely a <sup>1</sup>	92	41	66.6	7.74
Parachute t	84	25	49.8	1.35	Brant t	95	35	67.4	3.55
Red Cliff				2.09	Camak t	82	37	62.4	4.50
Rioo				0.37	Canton t				1.92
Rocky Ford t	87	15	54.2	0.00	Clayton t	80	28	56.0	2.95
Ruby t				4.37	Columbus t	94	40	66.2	6.41
St. Cloud				0.03	Cordele t	88	40	65.2	2.55
Saguache t	70	18	43.7	0.00	Covington	86	37	61.5	3.20
San Juan t	69	19	49.0	0.54	Dahlgren t	82	31	59.2	3.52
San Luis t	79	10	46.8	0.29	Darien t	91	45	70.5	2.43
Seibert t				0.23	Diamond t				1.99
Smoky Hill Mine t	76	20	51.1	0.05	Dublin a t	90	38	64.4	4.18
Springfield t				0.05	Dublin b t				4.24
Spring Gulch t				1.76	Eastman t	93	42	67.2	2.95
Stamford a <sup>1</sup>	70	10	40.8	0.70	Elberton t	91	38	62.1	6.33
Steamboat Spring t	76	15	46.4	0.70	Forayth a <sup>1</sup>	91	46	68.0	5.92
Sunnyside	68	10	41.5	0.63	Fort Gaines t	88	40	64.6	7.49
Surface Creek t	71	22	49.8	1.22	Gainesville t	81	34	59.8	3.28
					Griffin t	80	39	59.2	4.80
					Hawkinsville t	89	35	65.2	4.35
					Hephzibah a <sup>1</sup>	86	44	65.4	4.40

Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Georgia—Cont'd.					Illinois—Cont'd.				
Lafayette t	84	32	57.8	1.45	Tuscola a <sup>1</sup>	80	28	52.9	0.71
Lagrange t	87	36	61.8	3.30	Walnut t	85	27	54.0	1.43
Louisville t	92	37	65.6	3.28	Winnebago t	78	26	50.6	1.81
Macon a t	88	40	65.9	4.15	Zion t	77	27	51.0	3.68
Macon b				4.68	Indiana.				
Marietta t	85	35	60.0	2.44	Angola a <sup>1</sup>	82	27	52.8	3.03
Marshallville t	90	40	66.0	4.58	Bedford t	84	31	55.6	1.65
Millen t	94	35	65.8	5.27	Butlerville t	87	27	56.1	1.35
Monticello a <sup>1</sup>	85	47	65.4	6.10	Cambridge City t	80	25	53.3	2.83
Morgan t	91	39	66.0	5.64	Columbia City a <sup>1</sup>	76	29	51.5	2.27
Newnan t	86	40	62.4	3.95	Columbus t	84	31	57.1	1.70
Piccola	90	45	69.2	6.70	Connersville t	82	26	53.0	1.85
Point Peter a <sup>1</sup>	82	36	60.6	5.10	Crawfordsville t	89	28	54.4	0.75
Pontian t	92	36	65.8	4.82	Decatur a <sup>1</sup>	86	32	57.3	1.79
Quitman t	87	41	68.1	5.26	Delphi	83	30	55.1	0.91
Ramsey t	88	29	62.2	1.48	Evansville t	86	32	58.2	2.68
Resaca t				1.68	Farmland t	79	27	54.1	3.18
Reynolds t				4.80	Franklin a <sup>1</sup>	82	30	54.2	2.33
Rome t	82	35	60.4	1.69	Hammond t	77	30	51.5	0.92
Talbot t	86	37	62.6	6.70	Huntingburg t	84	30	55.8	1.30
Thomasville t	92	41	69.2	5.14	Huntington	80	30	53.1	2.04
Tooea t	86	32	61.0	2.70	Jasper t	85	31	57.0	2.20
Union Point t	85	38	62.6	4.63	Jeffersonville	85	32	56.9	1.22
Washington t	84	41	62.6	5.50	Kokomo t	82	28	54.1	1.36
Way Cross t	87	46	68.4	2.99	Lafayette t	84	26	54.1	1.05
Waynesboro t	86	40	64.8	5.19	Logansport a				1.44
West Point t	87	38	62.7	4.43	Logansport b	79	27	55.4	1.25
Whitesburg t				2.64	Madison t	85	32	58.2	1.34
Idaho.					Marengo a <sup>1</sup>	86	30	55.9	3.30
American Falls t	75	15	46.7	0.45	Marion t	80	25	54.0	1.90
Atlanta t	75	20	42.9	2.83	Mausy t	81	29	52.6	2.03
Boise Barracks t	79	29	51.5	2.46	Mount Vernon t				2.29
Chesterfield t	75	9	40.0	0.62	Muncie t	82	35	58.7	
Corral t				2.81	New Albany a <sup>1</sup>	82	35	59.2	1.46



## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Iowa—Cont'd.</b>	°	°	°	Ins.	<b>Kentucky—Cont'd.</b>	°	°	°	Ins.
Mechanicsville.....	80	29	52.3	0.63	Edmonton.....	80	30	56.0	1.22
Monticello *†.....	78	25	49.5	2.11	Eubank.....	88	25	56.8	1.58
Mount Pleasant *†.....	75	35	54.7	1.77	Falmouth.....	86	31	59.2	1.31
Mount Vernon *†.....	78	34	52.2	2.71	Franklin *†.....	87	39	60.8	0.93
Newton.....	82	27	52.9	2.71	Georgetown.....	84	30	58.1	1.30
North McGregor.....	83	28	51.0	3.82	Greendale.....	82	31	58.4	1.25
Ogden.....	83	30	46.3	3.38	Greensburg *†.....	81	31	55.0	1.05
Osage *†.....	82	32	48.0	2.86	Harrodsburg.....	86	27	57.0	2.60
Oskaloosa.....	82	24	53.5	1.66	Henderson.....	85	39	60.8	1.67
Ottumwa.....	83	28	54.6	3.33	Louisville.....	87	30	60.0	0.62
Orid.....	83	30	54.3	3.69	Marion.....	82	30	66.5	1.40
Panamint.....	83	25	52.5	2.71	Middlesboro.....	88	27	54.6	1.60
Richland.....	84	29	52.9	1.66	Mount Sterling.....	82	31	60.0	1.10
Rock Rapids.....	80	28	52.7	2.06	Paducah.....	89	36	61.6	1.15
Rockwell City.....	82	28	48.9	3.80	Pellville.....	88	30	59.3	1.31
Sac City.....	77	30	49.6	3.10	Princeton.....	88	27	55.9	0.76
Seymour.....	83	31	55.3	1.96	Richmond.....	89	37	58.4	3.00
Sibley.....	80	26	49.6	2.94	Russellville.....	92	33	62.7	1.15
Spirit Lake.....	85	27	49.1	2.16	Shelby City *†.....	84	32	57.2	1.13
Toledo.....	80	25	51.3	1.70	Shelbyville.....	89	26	58.2	1.32
Villisca.....	80	27	51.8	2.35	South Fork.....	90	29	58.6	1.45
Vinton.....	82	27	50.8	2.32	Springfield.....	90	29	58.6	1.10
Washington.....	83	23	52.7	1.56	<b>Louisiana.</b>				
Waukegan.....	81	32	52.2	1.88	Alexandria.....	91	42	69.2	0.45
Webster City.....	83	28	48.4	4.35	Amite.....	89	36	65.0	1.08
Williams.....	81	30	48.9	2.91	Bastrop.....	92	32	66.3	0.13
Wilton Junction.....	80	28	52.0	1.76	Baton Rouge.....	92	35	68.8	2.61
Winterset.....	83	29	52.4	1.75	Calhoun.....	89	36	65.6	0.83
<b>Kansas.</b>					Cameron.....	96	42	74.2	0.70
Abilene.....	88	28	59.5	1.79	Cheneyville.....	96	33	64.0	0.58
Achilles.....	87	29	47.6	0.42	Clinton.....	88	35	65.2	0.33
Allison.....	86	24	51.6	0.25	Cousshatta.....	90	32	66.6	1.10
Altova.....	89	29	56.6	1.81	Covington.....	90	33	66.0	0.16
Atchison.....	87	27	57.6	4.33	Delhi.....	92	39	71.9	0.75
Beloit.....	86	28	59.0	1.93	Donaldsonville.....	88	39	66.6	0.38
Blaine.....	85	30	55.1	2.90	Farmerville.....	90	38	67.8	0.44
Burlington.....	88	25	59.8	1.39	Grand Coteau.....	88	43	65.4	0.89
Colby.....	87	19	54.2	0.38	Houma.....	90	42	70.8	0.25
Coldwater.....	87	27	60.1	0.60	Jeanerette.....	93	36	67.4	0.24
Columbus.....	86	24	59.2	1.16	Lafayette.....	93	38	69.2	0.75
Coolidge.....	88	20	55.8	0.00	Lake Charles.....	90	40	70.3	1.59
Cunningham.....	87	25	59.5	1.21	Lake Providence.....	87	33	63.0	1.12
Downs.....	86	28	59.4	1.83	Lawrence.....	90	44	69.6	0.27
Eldorado.....	86	28	59.4	1.83	Liberty Hill.....	94	31	66.5	1.89
Elk City.....	87	32	60.2	1.91	Maurepas.....	92	37	67.5	0.65
Englewood.....	90	26	60.8	0.33	Melville.....	91	38	68.2	0.65
Eureka Ranch.....	89	20	57.0	0.38	Minden.....	92	33	67.9	1.98
Fort Riley.....	85	29	59.6	1.58	Monroe.....	88	38	66.0	3.23
Garfield.....	85	20	53.4	0.15	Natchitoches.....	91	33	65.1	0.63
Gibson.....	85	20	53.4	0.15	New Iberia.....	89	43	68.0	0.82
Gove.....	88	27	59.4	0.00	Opelousas.....	93	37	68.2	0.57
Granola.....	93	30	58.5	1.95	Oxford.....	92	29	64.4	1.77
Hays City.....	90	17	57.1	0.30	Paincourtville.....	92	39	66.8	0.30
Horton.....	86	28	57.0	1.99	Plain Dealing.....	88	32	65.8	0.71
Hutchinson.....	93	28	61.6	2.45	Rayne.....	94	38	70.0	1.42
Independence.....	88	29	61.8	1.31	Schriever.....	91	36	67.2	0.65
Ionia.....	89	21	57.8	0.93	Shell Beach.....	88	42	69.4	0.87
Jacut.....	90	21	55.8	0.21	Sugar Ex. Station.....	89	40	68.0	0.84
Johnson.....	87	26	58.0	0.30	Sugartown.....	88	32	62.8	2.02
Kiowa.....	87	28	60.6	1.47	Thibodeaux.....	89	42	68.0	0.25
Lakin.....	90	18	60.4	0.31	Wallace.....	89	42	68.0	0.30
Lebo.....	90	29	59.4	2.59	West End.....	90	42	68.0	0.98
Macksville.....	86	25	59.8	0.75	Winnboro.....	93	40	70.0	0.01
McPherson.....	86	27	59.0	0.49	<b>Maine.</b>				
Manhattan.....	93	24	59.6	1.68	Bar Harbor.....	64	36	49.6	4.96
Manhattans *†.....	90	24	54.1	1.69	Belfast.....	62	36	48.4	5.56
Marion.....	89	24	57.6	0.78	Calais.....	60	30	47.8	5.07
Medicine Lodge.....	86	27	57.9	1.53	Cornish.....	69	38	48.0	5.22
Minneapolis.....	89	19	55.8	0.30	Easton.....	68	38	46.3	7.25
Morland.....	85	27	58.4	0.54	Fairfield.....	65	30	48.1	2.41
Morton.....	84	33	60.5	1.07	Farmington.....	74	24	46.7	5.02
Mount Hope.....	85	32	61.4	0.28	Gardiner.....	67	32	49.8	4.25
New Eng. Ranch.....	85	14	52.2	0.25	Houlton.....	63	25	45.0	4.89
Oberlin.....	90	25	58.3	1.56	Lewiston.....	70	32	49.5	5.62
Oswego.....	89	22	60.2	0.59	Madison.....	66	30	48.2	5.30
Pleasant Dale.....	89	21	58.3	0.33	Mayfield.....	68	25	44.8	6.41
Rome.....	86	32	60.3	2.57	North Bridgeton.....	66	32	50.0	4.05
Salina.....	89	29	65.2	1.12	Orono.....	66	27	46.4	4.33
Sedan.....	88	34	62.6	1.52	Petit Menan.....	58	40	49.2	.....
Topelka.....	88	23	59.8	1.81	West Jonesport.....	92	32	48.0	.....
Tribune.....	87	25	54.6	0.20	<b>Maryland.</b>				
Ulysses.....	97	28	62.0	0.20	Bachmans Val. *†.....	80	31	52.8	3.65
Wakarusa.....	89	32	59.5	3.10	Boetcheville *†.....	82	34	54.2	2.60
Wallace.....	89	32	59.5	3.10	Charlotte Hall.....	85	33	58.0	3.15
Wamego.....	88	24	56.6	1.09	Cherryfield.....	80	38	56.9	3.28
Washington.....	94	24	58.2	0.84	Chester.....	84	39	55.4	3.41
Wellington.....	84	32	63.0	1.05	College Park.....	78	34	55.0	2.25
Westmoreland.....	88	28	60.6	2.80	Cumberland.....	80	33	56.0	5.90
Winfield.....	88	24	59.5	2.01	Deer Park.....	75	25	48.8	2.31
Yates Center.....	88	24	59.5	2.01	Denton.....	82	34	58.2	4.22
<b>Kentucky.</b>					Easton.....	80	37	60.0	3.20
Alpha.....	90	38	64.1	T.	Fallston.....	76	35	54.4	4.91
Blandville.....	85	33	59.9	1.04	Frederick.....	84	34	56.4	4.15
Bowling Green.....	85	29	54.9	0.96	Frederick.....	83	36	57.2	2.85
Bowling Green.....	87	33	60.2	0.83	Grantsville.....	78	28	51.4	2.95
Caddo.....	86	32	58.2	3.00					
Canton.....	88	34	59.8	0.84					
Carrollton.....	88	29	58.0	0.97					
Cattlettsburg.....	76	34	54.4	3.42					
Cromwell.....	86	34	60.6	1.05					
Earlington.....	86	34	60.6	1.05					
Eddyville.....	81	36	56.6	1.00					

## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Maryland—Cont'd.</b>	°	°	°	Ins.	<b>Michigan—Cont'd.</b>	°	°	°	Ins.
Great Falls *s.	82	35	57.0	4.57	Bronson .....	78	24	50.2	1.66
La Plata†.....	84	32	56.6	3.40	Calumet .....	64	30	45.4	4.75
McDonogh†.....	82	36	58.3	.....	Charlevoix.....	80	30	51.4	5.05
Mardela Springs†.....	83	33	57.8	4.35	Cheboygan.....	75	26	47.3	4.08
Mt. St. Marys Col *†	81	38	55.7	5.00	Clinton.....	77	23	50.2	3.43
Oakland†.....	73	25	48.4	2.89	Crisps *10.....	66	34	47.3	.....
Pocomoke City.....	85	34	61.3	5.15	Fairview.....	75	27	50.3	1.99
Popes Creek.....	86	35	59.4	2.80	Fitchburg.....	78	23	50.2	2.80
Princess Anne.....	83	30	57.6	4.77	Flint.....	80	31	49.4	2.15
Solomons†.....	88	40	60.9	4.27	Frankfort *10.....	70	36	53.2	.....
Sunnyside.....	79	24	48.5	2.82	Gladwin.....	77	22	48.0	2.16
Taneytown†.....	81	30	52.7	5.35	Grand Rapids.....	77	27	51.0	2.38
Woodstock.....	81	30	52.7	5.03	Grape.....	78	26	51.2	2.55
<b>Massachusetts.</b>					Grayling.....	76	20	48.8	1.60
Adams.....	72	32	51.1	.....	Grindstone City *10.....	78	33	49.6	.....
Amherst.....	68	30	50.3	4.02	Hammonds Bay *10.....	78	26	47.2	.....
Amherst Ex. St. n. a.	73	29	50.3	4.40	Hanover.....	75	27	51.5	3.80
Amherst Ex. St. n. b.	75	32	51.5	4.85	Harbor Springs.....	73	26	48.4	4.28
Andover.....	78	31	53.3	3.95	Harrison.....	75	.....	.....	2.02
Ashland.....	75	31	50.9	5.49	Harrieville.....	72	26	48.0	2.51
Bedford.....	75	31	50.9	3.90	Hart.....	78	25	50.7	4.50
Beverly Farms.....	68	33	50.9	5.19	Hayes.....	78	28	54.2	2.17
Blue Hill (sum't).....	75	33	51.7	6.50	Hesperia.....	73	18	45.6	1.63
Blue Hill (valley).....	77	27	50.3	6.27	Holland *10.....	68	36	54.2	.....
Boston.....	75	32	52.4	6.18	Howell.....	79	20	49.8	2.44
Brookton.....	75	32	52.4	6.52	Jeddo.....	78	25	50.2	2.05
Brookton.....	75	32	52.4	6.52	Kalamazoo.....	74	33	51.8	2.53
Brookton.....	75	32	52.4	6.52	Lake City.....	78	25	49.4	1.98
Cambridge.....	77	33	53.0	5.23	Lansing.....	78	25	49.4	1.98
Cambridge.....	77	33	53.0	5.23	Lathrop *1.....	72	32	47.6	2.11
Chestnut Hill.....	70	30	51.8	5.19	Lewiston.....	74	26	47.6	2.91
Clinton.....	70	32	52.6	6.04	Lodi.....	70	22	47.4	4.07
Dudley.....	70	33	50.6	2.32	Ludington *10.....	65	30	46.6	.....
East Templeton *1.	70	34	48.7	1.57	Madison.....	75	25	50.1	2.33
Egg Rock, Nahant.....	66	38	56.8	.....	Manistee *10.....	70	34	49.6	.....
Fall River *1.....	70	38	54.0	7.61	Mayville.....	79	27	50.7	2.68
Fiskedale.....	.....	.....	.....	2.83	Middle Island *10.....	63	33	49.0	.....
Fitchburg *1.....	73	33	49.4	4.44	Mottville.....	77	24	52.0	2.05
Fitchburg.....	76	31	50.3	4.04	Muskallonge L. *10.....	66	33	46.8	.....
Frammingham.....	76	28	51.3	5.20	N. Manitow Ist'd *10.....	75	32	50.3	.....
Groton.....	74	30	50.1	4.04	North Marshall.....	75	28	48.2	2.22
Hadley.....	74	25	49.8	4.77	Northport.....	68	31	49.4	4.55
Hingham.....	.....	.....	.....	7.34	Old Mission.....	70	32	48.1	4.10
Hyannis.....	75	37	56.3	6.01	Ottawa Point *10.....	72	33	49.8	.....
Lake Cochituate.....	80	23	50.2	5.14	Ovid.....	77	23	49.6	1.51
Lawrence.....	74	34	51.9	3.79	Paris.....	70	19	45.4	2.10
Leeds.....	70	28	47.6	6.57	Parkville.....	.....	.....	.....	2.49
Leominster *s.....	77	36	51.5	4.24	Pentwater *10.....	69	38	54.4	.....
Long Plain *s.....	72	32	53.3	9.44	Pteaux Barques *10.....	75	31	50.6	.....
Lowell.....	76	33	51.7	3.46	Point Betsey *10.....	65	42	52.6	.....
Lowell.....	78	30	50.5	.....	Pontiac.....	76	27	50.2	1.65
Lowell.....	80	33	53.6	.....	Roxsonville *1.....	80	28	51.3	3.22
Ludlow Center.....	70	27	48.5	4.03	Rowland.....	76	27	48.1	5.85
Lynn.....	68	34	50.5	5.79	St. Ignace.....	63	28	46.2	5.76
Lynn.....	74	34	52.0	.....	St. Johns.....	79	25	51.0	.....
Mansfield *1.....	71	26	49.6	7.27	Sand Beach *1.....	75	28	50.2	3.37
Middleboro.....	73	27	51.9	7.68	Sand Beach *10.....	65	35	50.9	.....
Milton.....	68	34	51.5	6.02	Ship Canal *10.....	70	30	48.6	.....
Monroe.....	71	28	45.6	4.50	Stanton.....	76	24	49.0	2.08
Monson.....	74	32	51.6	3.81	Sturgeon Point *10.....	68	20	49.4	.....
Mount Nonotuck.....	.....	.....	.....	5.29	Thornville.....	79	28	52.4	2.71
Mystic Lake.....	.....	.....	.....	5.55	Thunder Bay Id *10.....	62	34	49.3	.....
Mystic Station.....	.....	.....	.....	5.38	Two Heart River *10.....	70	30	46.3	.....
Natick *1.....	72	35	51.9	5.11	Vandalia.....	76	30	53.3	1.79
New Bedford a.....	70	34	53.8	7.64	Vermilion Pt. *10.....	58	31	41.5	.....
New Bedford b.....	73	33	53.5	7.63	Ypsilanti.....	76	21	49.6	3.17
Newburyport.....	.....	.....	.....	3.76	<b>Minnesota.</b>				
North Billerica.....	76	34	52.6	5.24	Alexandria†.....	72	22	40.6	2.52
Pittsfield.....	70	32	49.2	3.64	Alexandria b.....	72	26	47.2	2.25
Plymouth *1.....	72	37	54.7	7.91	Beardsley†.....	75	26	47.4	.....
Provincetown.....	73	37	53.7	5.60	Belle Plaine *1.....	70	30	44.4	.....
Randolph.....	73	37	53.7	6.29	Bingham Lake.....	80	26	49.4	2.78
Roberts Dam.....	.....	.....	.....	5.25	Bird Island.....	76	26	47.0	2.33
Roxbury.....	73	36	53.4	5.33	Blooming Prairie *1.....	76	28	47.4	2.75
Salem.....	.....	.....	.....	5.45	Bonniwells Mills†.....	75	31	47.7	2.68
Salisbury.....	.....	.....	.....	5.60	Caledonia†.....	73	22	48.2	3.09
Somersett.....	76	35	55.6	8.21	Cambridge†.....	73	23	46.1	3.45
Springfield Arm'y.....	72	34	52.8	4.98	Camden†.....	79	27	47.8	3.71
Taunton.....	70	32	53.0	7.28	Campbell.....	74	21	44.4	2.76
Taunton.....	73	27	52.2	8.93	Clear Lake†.....	72	26	44.9	2.76
Taunton.....	77	29	52.8	8.88	Clearwater *1.....	73	30	45.3	1.40
Wakefield†.....	73	31	51.3	5.40	Collegeville.....	75	30	48.6	1.01
Webster.....	.....	.....	.....	2.72	Crookston *†6.....	65	39	44.6	3.90
Westboro†.....	74	30	52.0	4.98	Farmington†.....	76	25	47.4	2.65
Williamstown.....	72	32	50.0	4.91	Fergus Falls†.....	72	25	45.2	3.85
Winchester.....	.....	.....	.....	2.63	Fort Ripley†.....	.....	.....	.....	3.10
Winthrop.....	75	37	52.7	4.47	Grand Meadow†.....	75	25	47.1	4.16
Worcester a.....	73	33	51.2	3.93	Granite Falls.....	79	27	48.7	3.37
Worcester b.....	74	35	51.9	3.96	Jadis.....	64	24	42.8	12.21
Worcester *1.....	75	33	49.6	.....	L Winnibigoshish *1.....	64	30	43.6	3.43
<b>Michigan.</b>	80	23	50.2	3.09	Lawrence†.....	71	25	47.4	2.36
Adrian.....	73	30	51.6	2.39	Leech Lake *1.....	66	26	42.8	4.46
Albion.....	77	25	51.4	3.76	Long Prairie†.....	72	25	45.0	2.72
Allegan.....	74	22	48.7	1.86	Luverne†.....	78	30	48.6	3.18
Alma.....	74	28	50.1	2.79	Maple Plain.....	76	29	48.0	2.81
Ann Arbor.....	78	26	47.8	2.14	Marfield†.....	66	22	42.0	5.69
Arbela *1.....	78	27	48.9	1.95	Mazeppa.....	74	24	46.4	3.30
Ball Mountain.....	73	24	48.0	5.46	Milan†.....	78	25	46.8	2.51
Bellaire.....	79	23	50.9	2.18	Minneapolis a†.....	74	29	48.4	4.52
Berlin *1.....	79	23	50.9	2.18	Minneapolis b.....	78	27	48.0	4.37
Berrien Springs *a1.....	76	30	53.5	2.35	Minnesota City†.....	76	28	48.0	3.01
Birmingham.....	75	25	50.6	1.74	Montevideo†.....	78	26	49.0	2.86
Bois Blanc *10.....	66	31	48.2	.....	Morris†.....	73	24	46.5	2.51
Boon.....	72	20	45.5	2.21	New Richland *1a.....	80	31	48.0	.....
					New Ulm.....	78	30	51.0	3.00



## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Minnesota—Cont'd.</b>					<b>Missouri—Cont'd.</b>				
Ortonville†	67	22	43.8	3.04	Houston	84	25	54.6	1.34
Park Rapids†	67	22	43.8	4.14	Houstonia (near)†	85	30	55.6	0.97
Pine River†	68	25	44.6	4.69	Iron†	86	35	56.2	1.93
Pleasant Mounds†	69	25	45.6	1.90	Kidder	86	35	56.2	3.19
Pokegama Falls†	69	25	45.6	4.52	Lamar	81	28	54.4	0.91
Red Lake†	65	23	43.3	3.81	Lamonte	81	28	54.4	1.09
Red Wing†	65	23	43.3	3.12	La Plata†	81	28	54.4	1.40
Redwood Falls†	65	23	43.3	3.12	Lebanon	86	30	56.6	0.81
Rolling Green†	78	30	45.2	3.30	Liberty	90	28	58.8	3.91
St. Charles†	73	33	48.0	4.10	Linn Creek†	86	30	56.4	0.45
St. Cloud	70	32	46.5	1.95	Louisiana Bridge†	85	26	56.5	1.44
St. Olaf	74	26	45.0	2.43	McCune†	85	26	56.5	3.05
St. Peter†	78	27	45.5	2.58	Marble Hill	87	26	57.7	2.12
Sandy Lake Dam†	67	23	43.9	5.38	Marceline	87	26	57.7	2.12
Sauk Center	72	30	41.8	3.10	Marshall†	81	26	49.6	1.45
Sunrise City†	74	24	45.2	3.30	Maryville†	83	28	55.8	0.87
Two Harbors†	72	31	47.6	6.22	Mexico†	88	34	61.0	1.56
Wabasha†	71	27	48.9	2.98	Miami	83	30	56.7	2.05
Willmar†	74	28	45.7	1.92	Mine La Motte†	88	25	58.3	1.53
Winona	75	30	50.6	2.77	Mount Vernon	88	25	58.3	1.53
Worthington	77	26	48.2	3.45	Nevada	87	22	51.7	0.77
<b>Mississippi.</b>					New Hartford†	86	26	60.4	1.01
Aberdeen†	88	31	62.2	0.59	New Madrid	84	35	62.2	1.15
Agricultural Col'ge.	86	40	65.0	0.75	New Palestine	83	33	58.6	1.35
Batesville†	84	32	61.0	0.33	Oakfield†	85	31	60.0	1.87
Bay St. Louis†	88	46	68.2	0.30	Oak Ridge†	85	31	60.0	2.90
Biloxi†	92	47	68.0	0.40	Olden†	88	28	57.4	2.15
Briers	87	40	64.3	0.24	Oregon	86	28	56.4	2.23
Brookhaven†	95	36	66.4	0.68	Oregon	86	28	56.4	2.23
Canton†	85	39	63.8	0.66	Palmyra	87	32	60.8	2.03
Columbus†	91	37	64.2	0.77	Panacea	87	32	60.8	2.03
Crystal Springs†	92	39	65.4	1.09	Pickering†	82	33	55.6	2.04
Duck Hill†	86	36	63.8	1.45	Platte River†	84	28	56.4	5.18
Edwards	92	37	65.2	1.06	Poplar Bluff	84	32	59.4	2.79
Egypt†	86	38	61.7	1.85	Potosi	82	33	53.8	1.85
Enterprise†	90	31	62.9	0.27	Princeton†	85	29	55.8	2.60
Fayette†	87	39	64.4	0.82	St. Charles	84	32	57.6	1.87
French Camp†	82	28	60.4	1.21	St. Joseph†	85	27	56.8	3.63
Greenville†	85	39	63.8	1.36	St. Louis	85	27	56.8	2.06
Greenville†	92	35	65.7	1.53	Sarcox†	94	30	57.4	1.49
Hattiesburg†	90	35	65.6	0.30	Sedalia	88	31	59.5	0.52
Hawthorne†	92	38	67.0	0.00	Steffenville	88	27	59.2	1.22
Hernando†	86	37	63.4	0.10	Stellada†	88	24	54.2	4.05
Holly Springs†	86	36	63.0	0.26	Sublett	82	24	54.2	4.05
Itta Bena	90	32	64.0	1.45	Tindall†	90	25	59.6	2.04
Jackson†	90	32	64.0	1.45	Unionville†	90	25	59.6	2.04
Kosciusko†	87	35	62.3	1.06	Vera Cruz	90	25	59.6	2.04
Lake†	88	35	63.0	0.65	Vilas	90	25	59.6	2.04
Leakesville†	91	36	66.9	5.32	Virgil City	90	25	59.6	2.04
Leona†	88	42	64.5	0.10	Warrensburg†	90	32	60.7	0.97
Logtown†	90	40	67.2	0.12	Warrenton	91	33	60.6	1.50
Louisville†	92	30	63.0	0.50	Wheatland	90	25	59.6	2.04
Macon†	88	30	62.8	0.35	<b>Montana.</b>				
Moss Point†	89	47	67.8	4.15	Anaconda†	82	23	49.4	1.19
Natchez†	90	36	67.0	0.80	Billings†	82	23	49.4	1.19
Okolona†	88	34	62.6	0.78	Boulder†	73	8	43.2	0.50
Palo Alto†	88	34	62.6	0.78	Bozeman†	67	14	43.4	1.15
Pontotoc†	89	36	64.4	0.29	Butte†	76	15	43.9	0.64
Port Gibson†	92	33	65.0	1.58	Cascade†	75	18	43.1	1.68
Stonington†	88	40	66.2	0.22	Cokedale†	75	18	43.1	1.68
Topton†	86	48	64.4	0.25	Columbia Falls†	66	21	42.3	1.51
University†	89	37	64.1	0.30	Fort Custer†	73	13	44.5	1.99
Vadon†	90	36	64.6	0.96	Fort Keogh	72	14	47.0	2.05
Water Valley†	95	35	61.9	1.20	Fort Logan†	75	0	40.8	0.96
Waynesboro†	96	34	65.6	0.10	Fort Missoula	73	21	43.7	1.56
Woodville†	92	40	68.4	0.53	Glasgow†	75	20	44.4	2.41
Yazoo City†	88	35	64.6	1.01	Glendive†	75	25	47.4	1.67
<b>Nebraska.</b>					Great Falls†	72	18	45.2	0.30
Akron	85	27	58.9	3.25	Hogan†	72	18	45.2	0.30
Appleton City†	85	27	58.9	3.25	Kipp†	70	12	40.1	1.14
Arthur†	85	27	58.9	3.25	Martinsdale†	77	17	42.8	0.91
Bagnell†	87	27	56.4	0.53	Marysville†	72	15	43.2	1.40
Bethany†	87	27	56.4	0.53	Mingusville†	82	17	47.8	0.16
Birch Tree	84	31	58.2	2.44	Radersburg†	69	13	40.4	2.05
Bluffton†	85	31	59.2	1.29	Red Lodge†	69	13	40.4	2.05
Boonville†	85	28	57.2	1.64	Utica†	76	10	45.2	1.34
Brunswick	85	28	57.2	1.64	Virginia City†	72	13	44.2	0.85
Carrollton†	85	33	58.6	0.04	<b>Nebraska.</b>				
Carthage	85	33	58.6	0.04	Agee†	82	26	50.1	2.04
Conception	85	30	59.0	4.70	Ansley†	81	21	52.0	1.06
Cowgill†	86	30	59.7	2.47	Arborville†	86	28	57.1	1.65
Darksville†	85	30	57.0	1.31	Ashland†	87	26	54.2	2.52
Downing	85	30	57.0	1.31	Auburn†	88	25	56.1	4.06
East Lynne†	86	26	54.1	1.83	Hassett†	81	22	49.8	0.44
Edge Hill†	90	30	56.3	1.63	Beatrice†	85	27	54.6	2.49
Eight Mile†	87	38	57.9	2.02	Beaver City	85	22	55.7	0.93
Eldon†	88	38	60.7	0.69	Bratton†	85	28	54.2	3.93
Elmira	94	22	56.6	3.13	Burwell†	78	32	56.5	2.52
Emma†	85	34	57.2	0.52	Callaway†	80	20	49.3	0.76
Fairport	85	34	57.2	0.52	Chadron†	80	20	49.3	0.76
Farmersville	85	34	57.2	0.52	Chester†	86	26	53.9	1.07
Fayette	85	34	57.2	0.52	Columbus†	83	26	53.2	1.55
Fox Creek†	82	32	59.0	2.08	Cornelia	81	28	51.8	2.61
Fulton	85	30	57.4	0.65	Cortland†	81	28	51.8	2.61
Gallatin†	85	30	57.4	0.65	Creighton†	80	25	48.1	3.04
Gayoso†	88	32	58.3	1.12	Crete	86	26	55.6	3.45
Glasgow	88	27	56.0	0.83	Culbertson	85	15	52.2	0.40
Glensted	85	30	57.4	0.84	Curtis†	85	15	52.2	0.40
Gordonville†	83	33	54.1	3.62	David City†	81	29	49.9	1.65
Gorin†	83	33	54.1	3.62	Elba	85	15	52.2	0.40
Greenville	86	24	53.2	1.36	Ericson†	90	28	52.6	1.21
Grove Dale	89	18	53.6	1.31	Ewing†	84	26	55.6	3.02
Half Way	82	27	52.8	1.08	Fontanelle	84	26	55.6	3.02
Harrisonville†	90	23	58.4	1.39	Fort Robinson	82	21	51.2	0.11
Hermann†	89	23	58.4	1.39	Franklin†	87	23	54.3	0.91

## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Nebraska—Cont'd.</b>					<b>N. Hampshire—Con.</b>				
Geneva†	87	24	51.8	0.95	Dublin†	70	31	47.8	3.23
Genoa†	84	30	54.2	1.48	Grafton	72	24	47.9	3.53
Gering†	82	25	53.4	0.14	Hanover	67	27	48.7	2.82
Glenwood	86	22	55.6	1.21	Keene	70	25	48.0	2.18
Gothenburg	86	22	55.6	0.91	Lakeport	66	28	49.3	2.76
Haigler†	84	24	51.3	0.18	Lancaster	66	28	49.3	2.76
Hartington†	81	26	51.6	1.76	Littleton	67	27	47.0	2.44
Harvard†	86	25	53.3	1.53	Vine Falls	76	28	50.8	3.51
Hay Springs†	82	17	48.4	0.55	Nashua	76	28	50.8	3.51
Hebron†	89	24	55.5	1.01	Newton	74	30	49.0	5.39
Heldrege†	82	23	50.8	0.86	North Conway	75	24	47.8	3.64
Imperial†	83	23	51.2	0.57	Pennichuck Station	74	25	47.4	3.82
Indianola†	87	16	55.2	0.35	Peterboro	70	23	40.4	3.83
Kennedy†	78	27	50.9	0.15	Plymouth	72	27	45.8	3.05
Kimball	83	17	50.5	T.	Sanborn†	70	27	46.5	2.70
La Peer	86	24	54.9	0.10	Stratford	70	27	46.5	2.70
Lexington†	86	24	54.9	1.57	Weirs Bridge	68	23	45.6	2.54
Lodge Pole†	84	26	49.5	0.25	West Milan	68	23	45.6	2.54
Lynch†	84	26	49.5	1.96	Wolfboro	68	23	45.6	2.54
Madison	87	22	51.7	1.86	<b>New Jersey.</b>				
Madrid†	87	22	51.7	0.28	Allaire	78	27	54.2	.....
Marquette†	81	28	54.8	1.48	Asbury Park	73	35	55.1	7.72
Minden†	82	26	52.4	0.78	Barneget	77	33	56.0	5.50
Mullen†	80	28	51.4	.....	Bayonne	76	30	56.4	4.84
Nebraska City†	81	27	52.1	4.09	Bench Haven	74	37	57.8	7.50
Nesbit†	82	22	52.1	0.50	Belvidere	77	30	54.0	5.03
Norfolk†	78	27	50.5	1.49	Beverly†	87	33	57.3	5.95
North Loup†	84	21	53.8	1.55	Billingsport†	82	37	55.4	5.32
Oakdale†	83	26	50.8	1.75	Blairsville	76	32	53.4	4.04
Ogallala†	84	26	50.8	1.75	Bridgeton	85	38	58.4	6.34
O'Neill†	92	26	49.8	0.00	Camden	81	35	55.7	5.21
Ough	84	30	51.2	1.35	Cape May	77	42	59.6	3.90
Palmer†	84	30	51.2	1.30	Cape May C. H.†	78	38	57.9	6.53
Plattsmouth†	84	26	51.2	3.49	Charlotteburg	73	37	50.4	6.15
Red Cloud	84	26	51.2	0.72	Chester†	72	37	51.6	5.95
Santee Agency†	85	24	51.9	1.57	Coleville	75	34	52.6	5.90
Seward†	85	31	55.0	1.13	Dover	77	29	52.5	5.45
Springview	82	20	50.2	0.50	Egg Harbor City	84	32	55.2	6.41
Stanton†	82	29	50.8	1.87	Elizabeth†	74	33	54.9	5.48
State Farm	88	28	56.4	2.52	Franklin Furnace	70	32	51.8	4.83
Superior†	86	26	57.3	0.75	Franklinville	84	28	54.4	7.04
Sutton	86	26	53.5	1.32	Freehold	80	31	55.2	6.41
Tecumseh†	84	24	51.9	4.62	Friesburg	74	28	51.6	5.60
Tekamah	86	24	51.8	2.30	Gillette	74	28	51.6	4.30
Turlington†	84	25	54.0	3.33	Hammonont	75	31	53.2	6.25
Wakefield	83	25	49.4	3.23	Hanover	81	31	53.2	5.27
Wallace†	83	25	49.4	0.40	Hightstown	75	31	55.4	5.20
Weeping Water†	82	26	49.9	3.54	Imlaystown	83	34	57.6	6.29
Whitman	82	26	49.9	0.32	Junction	73	36	55.4	5.15
Wilcox	80	29	52.8	1.35	Lambertville	73	36	55.4	3.93
York†	80	29	52.8	1.61	Millville	86	34	58.6	5.30
<b>Nevada.</b>					Moorestown	85	34	55.2	6.86
Austin	71	28	49.1	0.00	Newark	72	37	54.5	4.55
Battle Mountain†	87	30	56.9	T.	Newark †	73	37	55.2	5.21
Belleville†	84	30	54.6	0.01	New Brunswick	78	33	56.0	5.36
Belmont	74	19	49.0	0.09	New Brunswick †	74	34	54.0	4.65
Beowawe†	85	26	51.5	0.00	Newton	71	30	52.2	4.95
Carlin†	80	12	44.1	T.	Ocean City	76	36	58.1	6.81
Carson City	80	19	50.6	0.20	Oceanic	76	38	57.0	7.18
Clover Valley†	80	19	50.6	0.88	Papakating	74	34	55.6	3.95
Cortes†	80	19	50.6	0.10	Paterson	74	34	55.6	5.38
Cranes Ranch	80	19	50.6	0.31	Pensauken	74	34	55.6	4.90
Downeyville	84	27	56.0	0.14	Perth Amboy	76	36	55.8	5.32
Elko†	75	16	46.1	0.60	Plainfield	77	31	55.6	5.50
Ely	70	15	46.6	0.05	Rancocas†	73	39	.....	6.12
Empire Ranch†	94	5	53.1	0.05	Readington†	78	36	59.3	.....
Fenelon†	70	20	45.1	0.50	Ringoes	78	36	59.3	5.89
Genoa	77	30	53.6	1.23	River Vale	73	27	53.2	6.06
Goldonda†	84	36	54.1	0.09	Somerville	81	31	56.4	4.66
Gold Hill	85	28	55.8	0.45	South Orange	77	32	53.9	5.28
Halleck†	82	12	42.6	0.61	Tenafly	72	30	54.5	6.72
Hawthorne†	74	37	55.7	0.00	Toms River	84	32	55.8	8.23
Hawthorne †	78	35	54.4	0.00	Trenton	84	35	57.6	5.13
Hobart Creek	84	28	55.0	2.22	Vineland	86	34	56.9	6.43
Hot Springs†	84	28	55.0	0.00	West Summit †	72	35	53.3	.....
Humboldt†	70	32	48.4	T.	Whiting	84	34	57.2	7.12
Lewers Ranch	81	26	53.0	2.51	Woodbine	82	23	55.3	6.83
Lovelock†	90	30	57.4	0.00	<b>New Mexico.</b>				
Mill City†	82	35	48.8	.....	Albert†	84	31	59.3	T.
Osceola	80	26	52.6	T.	Albuquerque†	79	28	56.9	0.49
Palisade†	80	20	54.0	0.70	Alma†	87	30	59.0	2.01
Palmetto	79	18	47.0	0.40	Chama†	83	17	50.2	0.90
Paradise Valley	87	19	51.8	0.11	Ciruella	.....	.....	.....	0.01
Reno†	74	35	52.2	0.35	Deming†	86	41	67.0	0.45
Reno State Univ.†	74	35	52.2	0.16	East Las Vegas†	76	19	52.7	0.08
Ruby Valley†	74	35	52.2	0.65	Eddy†	91	38	65.4	T.
St. Clair	74	23	51.4	0.00	Fort Bayard	86	29	62.0	1.40
Stofel	82	23	51.4	0.81	Fort Stanton†	83	21	55.5	1.46
Sunnyside	83	17	58.2	0.16	Fort Wingate	84	24	53.9	1.27
Tecoma†	74	24	46.4	0.33	Galisteo†	75	29	54.3	0.55
Toano†	78	24	45.9	T.	Gallinas Spring†	82	25	60.9	0.23
Tybo	79	23	51.2	0.05	Gila	.....	.....	.....	1.44
Verdi†	78	27	51.5	1.60	Halls Peak†	74	12	48.3	0.47
Virginia City	69	26	48.4	1.00	Las Cruces†	91	23	60.4	0.47
Wadsworth†	86	22	51.5	T.	Lordsburg†	83	20	56.8	0.90
Wells†	84	20	51.7	0.10	Los Lunas†	82	28	54.8	0.40
Winemucca†	78	39	51.4	0.00	Monero†	74	14	44.4	0.86
Yerington	80	25	53.0	0.05	Olot†	83	27	54.2	0.55
<b>New Hampshire.</b>					Pecos	.....	.....	.....	0.74
Astead†	67	32	48.3	2.68	Pojnaque	.....	.....	.....	0.59
Belmont	69	35	46.6	2.77	Rincon	89	22	62.3	0.29
Berlin Mills	69	35	46.6	3.55	Roswell†	85	28	60.5	0.04
Bethlehem	70	36	46.6	2.40	San Marcial†	83	26	58.0	0.47
Brookline†	71	36	50.1	4.20	Springer†	80	20	58.8	T.
Brookline	71	36	50.7	2.79	Sulphur Hot Spgs†	68	12	43.8	1.00



## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>N. Mexico—Cont'd.</i>					<i>N. Carolina—Cont'd.</i>				
Taos f.....	81	15	50.2	0.93	Highlands.....	74	24	51.2	3.21
<i>New York.</i>					Horse Cove f.....	76	32	55.6	3.38
Adams Center.....	77	30	51.6	4.03	Lenoir * f.....	79	33	56.3	5.38
Akron.....	77	30	49.8	4.07	Lilesville.....	85	31	58.5	5.45
Alfred Center.....	77	30	49.5	3.64	Littleton f.....	84	34	60.0	5.96
Angelica f.....	76	27	49.5	3.37	Louisburg f.....	85	37	63.7	5.96
Arcade.....	76	30	49.5	4.22	Lumberton f.....	85	37	63.7	5.96
Arkwright.....	73	34	50.8	4.30	Lynn * f.....	85	35	60.2	5.64
Atlanta.....	75	36	52.4	4.17	Mocksville f.....	85	35	60.2	5.64
Baldwinsville.....	75	36	52.4	4.17	Monroe f.....	85	35	60.2	5.64
Bedford.....	73	30	52.8	5.14	Morganton * f.....	82	29	57.2	5.05
Big Sandy * f.....	70	37	53.5	4.39	Mount Airy f.....	83	30	56.4	3.27
Binghamton.....	80	30	50.7	5.62	Mount Pleasant.....	84	32	59.2	7.80
Bolivar.....	77	30	50.7	5.62	Murphy f.....	86	46	65.9	4.49
Bovina Center.....	77	30	50.7	5.62	Newbern f.....	86	46	65.9	4.49
Brookfield.....	73	30	49.9	3.08	Oak Ridge f.....	83	32	58.6	5.09
Canton f.....	75	31	48.5	4.23	Pantego.....	82	32	57.2	7.19
Charlotte * f.....	68	30	50.9	4.35	Pittsboro.....	84	38	62.8	6.05
Cherry Creek.....	72	31	48.8	4.73	Raleigh * f.....	88	34	61.3	6.45
Cooperstown f.....	72	31	48.8	4.73	Rockingham f.....	84	32	58.2	5.29
Cortland.....	70	35	50.7	4.39	Roxboro f.....	82	41	61.4	7.50
De Kalb Junction.....	77	30	50.7	4.39	Salisbury a.....	85	26	55.8	3.89
Demeter.....	77	30	50.7	4.39	Saxton f.....	85	26	55.8	3.89
Deposit.....	77	30	50.7	4.39	Selma.....	84	36	61.4	4.40
Dunkirk.....	77	30	50.7	4.39	Skyuka.....	78	40	59.8	6.77
Eden Center.....	82	30	52.6	5.15	Sloan f.....	86	35	63.3	7.98
Ellis.....	77	33	53.7	4.21	Soapstone M't f.....	86	30	57.2	7.36
Elmira f.....	77	33	53.7	4.21	Southern Pines f.....	88	36	62.6	6.96
Fleming.....	77	31	52.5	5.04	Tarboro.....	88	34	62.0	6.96
Fort Niagara f.....	71	32	52.1	1.84	Waynesville f.....	78	25	53.4	6.87
Friendship.....	77	25	49.3	3.50	Weldon f.....	85	34	59.6	6.87
Glens Falls.....	71	29	50.1	4.59	Wilmington.....	85	32	60.0	7.97
Gloversville.....	71	30	49.1	4.93	<i>North Dakota.</i>				
Hamilton.....	77	29	49.2	4.40	Ashley.....	75	19	43.5	2.52
Hess Road St'n f.....	69	35	49.7	1.90	Berlin f.....	72	20	41.0	1.48
Honeydew Brook.....	69	31	50.5	4.06	Bottineau f.....	72	20	42.0	2.45
Humphrey f.....	80	31	51.7	3.37	Churchs Ferry.....	70	20	42.2	4.16
Hyndsville.....	72	29	50.2	4.09	Dickinson f.....	67	18	41.8	1.87
Ithaca.....	76	34	52.3	4.94	Ellendale.....	75	30	44.9	1.87
Jamestown * f.....	73	35	52.4	4.94	Fargo f.....	76	24	43.6	1.11
Kings Station.....	77	29	49.8	4.72	Forman f.....	76	18	43.8	1.57
Lebanon Springs.....	77	29	49.8	4.72	Fort Berthold.....	74	20	46.2	1.52
Le Roy.....	76	30	50.8	3.62	Fort Yates f.....	75	20	43.7	1.04
Lockport.....	76	34	52.4	3.35	Gallatin f.....	71	17	42.3	1.65
Lowville.....	76	30	49.3	5.28	Grafton f.....	68	20	41.6	0.89
Madison Barracks f.....	76	37	54.4	4.71	Jamestown f.....	75	25	46.0	0.99
Malone.....	69	30	47.6	3.43	Kelso f.....	64	20	42.6	1.14
Marlboro.....	74	31	53.0	4.49	Lakota f.....	64	20	41.5	2.70
Massena.....	73	30	46.8	4.17	Larimore f.....	71	19	41.6	0.50
Middleton.....	70	34	52.0	5.38	Lemert f.....	70	19	41.6	0.50
Minnekahta.....	70	34	52.0	5.38	McKinney.....	71	19	42.0	0.35
Mount Morris.....	78	31	52.0	6.90	Milton f.....	66	19	41.0	2.36
Newark Valley.....	76	25	47.9	4.07	Minto f.....	69	22	43.0	1.62
New Lisbon.....	76	25	47.9	4.07	Napoleon f.....	75	18	44.2	0.65
North Hammond f.....	72	28	50.7	5.31	New Salem.....	76	20	44.5	0.65
Number Four f.....	72	28	49.7	6.70	Oakdale f.....	68	25	45.4	1.06
Odenburg.....	73	34	51.8	3.49	Portal f.....	69	21	45.4	0.35
Ontonagon.....	73	34	51.8	3.49	St. John f.....	66	26	41.0	2.33
Oxford.....	74	26	49.0	5.97	Steele f.....	67	16	43.7	1.13
Perry City.....	74	34	50.7	4.41	University f.....	77	24	43.7	3.05
Phoenix.....	75	29	49.8	4.33	Valley City f.....	70	21	44.2	2.15
Pine City.....	75	29	49.8	4.33	White Earth * f.....	73	24	46.4	1.43
Plattsburg B'ks.....	65	31	50.1	3.03	Wild Rice f.....	69	16	41.0	0.61
Port Jervis.....	71	29	51.6	6.06	Woodbridge f.....	68	18	40.2	1.76
Potsdam f.....	77	31	47.3	3.67	<i>Ohio.</i>				
Poughkeepsie.....	74	29	51.7	5.05	Akron.....	79	29	53.5	2.15
Rome.....	72	34	50.5	4.69	Annapolis.....	86	26	53.4	2.26
Romulus.....	79	32	53.4	3.92	Arcanum.....	79	26	51.5	1.79
Roundout.....	79	32	53.4	3.92	Ashland.....	84	25	54.1	1.55
Saranac Lake.....	71	29	46.5	4.10	Athens.....	78	30	52.4	1.86
Scottdale.....	72	37	55.5	3.28	Atwater.....	84	23	51.3	1.49
Skaneateles.....	71	29	46.5	4.10	Bangorville.....	88	24	52.3	2.68
South Canisteo.....	78	30	50.1	4.40	Bellefontaine.....	80	27	55.3	3.88
South Kortright f.....	73	25	47.8	5.79	Bement.....	82	25	50.9	3.65
Stillwater.....	73	30	51.8	5.79	Benton Ridge.....	85	24	53.8	3.27
Turin.....	71	30	48.4	6.35	Bethany.....	85	24	53.1	0.90
Varysburg.....	84	29	51.5	4.62	Binola.....	83	27	54.7	2.97
Wappingers Falls.....	73	33	52.5	5.98	Bissella.....	80	27	52.6	2.46
Warwick.....	85	30	51.8	5.36	Bladensburg.....	83	20	52.5	1.42
Watertown.....	82	28	52.4	5.55	Bloomington.....	83	27	54.4	1.75
Waverly f.....	82	28	52.4	5.55	Bowling Green.....	84	22	52.8	2.44
West Chazy.....	74	35	56.2	6.25	Bucyrus.....	82	25	53.8	2.70
West Point f.....	72	37	55.2	6.74	Caledonia f.....	82	21	50.0	1.48
Willetts Point.....	72	37	55.2	6.74	Cambridge.....	86	25	55.7	1.07
<i>North Carolina.</i>					Camp Dennison.....	84	26	49.6	1.92
Asheville f.....	81	28	56.5	2.68	Canal Dover.....	84	26	49.6	1.92
Auburn * f.....	91	37	61.9	5.52	Canton f.....	84	26	49.6	1.92
Bailey * f.....	86	32	58.5	5.74	Cardington.....	81	20	52.5	1.20
Bakersville f.....	81	24	54.3	1.95	Carrollton.....	84	24	53.6	2.13
Blowing Rock f.....	79	30	54.0	3.96	Cedarville * f.....	78	36	59.7	0.95
Bryson City f.....	86	34	59.2	6.84	Celina.....	81	32	56.5	3.33
Chapel Hill f.....	86	34	59.2	6.84	Cherry Fork.....	85	26	53.5	1.45
Currituck Inlet f.....	82	35	60.4	6.43	Circleville f.....	84	26	55.2	1.61
Experiment'l Farm.....	82	35	60.4	6.43	Clarksville.....	81	32	54.2	3.42
Fair Bluff f.....	86	35	61.0	7.49	Clifton.....	86	23	54.5	1.22
Falkland * f.....	86	35	61.0	7.49	Coalton.....	87	20	52.9	2.11
Fayetteville f.....	78	26	53.4	4.27	Colebrook.....	87	20	52.9	2.11
Goldboro f.....	85	39	63.8	7.00	Cynthiana.....	85	27	56.8	1.43
Greensboro f.....	86	44	61.6	5.37	Daytona.....	85	28	56.1	1.43
Henderson f.....	85	33	59.4	6.90	Dayton f.....	80	25	51.3	2.34

## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Ohio—Cont'd.</i>	o	o	o	<i>Ins.</i>	<i>Oklahoma—Cont'd.</i>	o	o	o	<i>Ins.</i>
Demos.....	81	28	55.6	1.66	Burnett f.....	94	29	64.5	2.74
Dupont.....	81	28	52.7	1.35	Clifton f.....	92	28	63.2	1.12
Ellsworth.....	80	28	52.8	1.80	Fort Reno f.....	92	33	64.2	1.49
Elyria.....	85	30	54.1	2.51	Fort Sill.....	92	32	61.9	1.09
Fairport Harbor * f.....	80	42	54.0	1.82	Fort Supply f.....	92	24	60.1	0.40
Fayetteville.....	84	26	54.4	1.82	Guthrie.....	90	35	64.7	3.12
Findlay.....	83	23	52.9	3.40	Keokuk Falls f.....	90	29	50.8	1.94
Fostoria.....	82	28	54.0	4.27	Mangum f.....	90	33	65.5	2.51
Frankfort.....	82	30	57.2	1.57	Norman f.....	93	30	64.1	1.16
Garrettsville.....	81	24	50.3	2.26	Ponca f.....	91	26	65.0	2.30
Georgetown.....	85	32	58.3	1.86	Pond Creek f.....	90	26	60.7	2.05
Granville.....	82	23	53.2	1.97	Stillwater f.....	91	30	61.4	0.72
Gratiot.....	85	24	54.4	1.67	Winnview f.....	92	33	64.0	1.33
Greenfield.....	80	28	55.2	1.80	<i>Oregon.</i>				
Green Hill.....	83	23	51.0	2.12	Albany a f.....	80	36	52.6	1.36
Greenville.....	79	28	52.8	2.58	Albany b * f.....	79	30	51.2	1.19
Guyaville f.....	86	23	55.9	0.78	Arlington f.....	71	34	52.1	2.10
Hackney.....	81	25	53.3	1.94	Ashland a * f.....	85	31	54.2	1.80
Hanging Rock.....	85	28	55.0	1.73	Ashland b.....	85	31	54.2	1.80
Harbor.....	85	27	54.1	4.91	Aurora * f.....	77	40	53.7	4.21
Hedges.....	85	24	53.3	2.98	Aurora (near).....	73	33	51.8	5.14
Hillhouse.....	82	26	52.1	5.12	Bandon.....	73	42	54.4	9.84
Hillsboro.....	88	22	56.5	1.62	Brownsville * f.....	74	34	52.8	4.79
Hiram.....	79	27	53.1	2.32	Burns f.....	77	10	38.8	1.85
Jacksonboro.....	89	31	57.3	1.00	Canyon City f.....	77	31	55.6	1.56
Kenton f.....	82	27	54.2	1.67	Comstock * f.....	76	38	51.8	5.16
Kilbourne.....	86	23	53.1	1.67	Cornelius.....	74	32	50.4	5.74
Killbuck.....	82	25	53.2	1.86	Corvallis a.....	75	31	50.8	4.45
Leipsic.....	82	29	53.6	3.21	Corvallis b * f.....	75	32	49.8	4.23
Levering.....	81	16	49.8	1.59	Corvallis (near).....	72	34	52.7	5.48
Logan.....	85	24	52.6	2.34	Crook.....	76	32	47.9	2.59
Lordsburg.....	79	27	51.2	1.81	Detroit f.....	71	31	48.1	11.34
Lowell.....	82	25	52.3	0.42	Eugene.....	75	34	53.3	4.36
McArthur.....	84	25	55.0	2.02	Forest Grove.....	73	30	50.4	5.74
McConnellsville.....	85	25	54.6	1.67	Gardiner.....	70	39	54.2	7.42
Manassah f.....				1.99	Glenora.....	77	27	49.6	17.36
Marietta a f.....				1.48	Grants Pass a f.....	90	28	54.0	3.04
Marietta b.....	81	30	53.7	1.60	Grants Pass b * f.....	76	36	53.9	3.19
Marion.....	82	24	54.4	2.03	Happy Valley.....	78	21	46.6	1.74
Millfordon.....	82	15	52.1	1.90	Heppner f.....	81	30	50.6	1.90
Milligan.....	86	20	55.1	1.41	Hood River (near).....	70	33	47.4	3.93
Millport.....	80	33	55.9	2.26	Hubbard.....	73	30	50.8	4.36
Montpelier.....	77	25	49.7	2.64	Jacksonville.....	78	33	52.4	2.23
Napoleon.....	79	23	54.2	2.52	Joseph f.....	70	22	42.7	2.14
New Alexandria.....	81	34	55.3	2.18	Junction City * f.....	82	40	56.6	3.89
New Berlin.....	80	25	52.5	1.72	Lafayette * f.....	74	38	54.0	3.36
New Bremen.....	83	25	53.5	2.67	La Grande f.....	76	27	49.4	2.40
New Comerstown.....	81	22	52.7	1.48	Langlois.....	76	36	56.9	11.33
New Holland.....	85	22	53.8	1.41	Lone Rock.....	80	22	46.2	2.03
New Waterford.....	89	31	54.0	2.20	McMinnville a f.....	76	28	51.0	5.76
North Fairfield.....	82	33	55.0	0.75	McMinnville b * f.....	76	36	52.1	4.25
North Lewisburg.....	85	27	55.2	1.85	Merlin.....	90	40	52.5	3.92
North Royalton.....	83	25	52.8	2.71	Monmouth * f.....	78	38	54.5	3.91
Norwalk.....	81	25	52.5	3.40	Mount Angel f.....	75	33	52.0	4.75
Oberlin.....	82	27	53.1	3.30	Nehalem.....				73.03
O. S. University.....	88	23	53.5	1.73	Newport.....	88	38	54.6	7.04
Orangeville.....	76	22	51.1	1.35	Pendleton.....	82	28	51.6	1.92
Ottawa.....	83	25	52.4	2.87	Portland * f.....	75	38	53.0	4.40
Pataskala.....	83	23	52.7	2.05	Riddies * f.....	78	36	54.3	2.99
Plattsburg.....	83	25	54.4	1.33	Roseburg * f.....	78	36	54.9	3.46
Pt. Marblehead * f.....	74	44	56.8	1.11	Salem a * f.....	70	36	49.6	3.83
Pomeroy.....	83	27	54.5	1.20	Salem b f.....	72	36	52.2	4.36
Portsmouth a f.....				1.64	Sheridan * f.....	72	36	52.3	5.28
Portsmouth b.....	83	20	55.5	1.05	Silverton * f.....	74	36	52.3	4.41
Richwood.....				1.25	Siskiyou * f.....	80	28	53.3	1.40
Ridge.....	80	25	51.9	3.87	Sparta.....	74	21	46.0	2.28
Ridge v'le Corners.....	81	25	52.4	2.39	Springbrook.....	77	37	53.1	4.89
Ripley.....	84	28	55.4	1.89	Springfield * f.....	72	34	52.2	4.43
Rittman.....	79	26	51.4	2.37	The Dalles.....	76	34	52.2	2.00
Rocky Ridge.....	82	26	53.5	2.22	Tillamook R'k L. H.....				10.30
Rosewood.....	81	25	52.6	2.36	Umatilla.....				0.60
Sharon Center.....	82	36	58.9	2.10	Vale.....	80	18	47.6	0.90
Shenandoah.....	84	22	52.5	1.95	West Fork * f.....	74	38	53.8	4.07
Sidney a f.....				2.90	Weston.....	81	32	50.4	2.46
Sidney b.....	83	24	54.4	2.90	Williams.....	82	29	52.2	2.76
Springboro.....				1.38	<i>Pennsylvania.</i>				
Stoutsville.....				1.66	Altoona.....	79	37	57.5	1.77
Swanton.....	78	24	52.1	2.21	Aqueduct.....	79	32	55.3	5.52
Sylvania.....	80	21	50.4	1.72	Beaver Dam f.....				1.65
Thurman.....	86	24	55.4	1.23	Bethlehem * f.....				6.04
Tiffin f.....	81	28	53.9	4.28	Blooming Grove * f.....	78	37	53.7	5.43
Upper Sandusky.....	90	38	58.7	3.53	Brookville f.....				2.36
Vanceburg.....	86	28	55.5	1.46	Browsers Look.....				5.05
Van Wert.....	80	26	51.9	2.06	Carlisle a.....	83	31	54.5	4.58
Vermillion.....	81	30	53.1	3.38	Casandra.....	73	31	51.3	2.84
Vickery.....	81	27	53.0	3.09	Chambersburg f.....	84	30	54.2	5.44
Walnut.....				1.69	Clarion f.....				2.95
Warren.....	84	24	52.6	2.03	Coatesville.....	83	29	55.5	5.57
Warsaw.....	84	19	52.2	1.41	Confluence f.....				2.71
Wauseon.....	81	23	51.7	2.42	Coopersburg.....	76	35	54.3	5.62
Waverly.....	86	23	55.7	1.51	Davis Island Dam f.....				2.00
Waynesville.....				1.35	Doylestown.....				4.84
Wellington.....	86	27	54.5	2.06	Drifton.....	77	35	52.0	5.15
Westerville.....	79	26	53.1	1.79	Du Bois f.....				2.74
Weymouth.....	84	23	51.5	3.50	Dyberry f.....	79	25	49.2	5.43
Wheeler f.....				4.54	East Mauch Chunk.....	75	30	52.4	7.07
Willoughby.....				3.80	Easton.....	72	35	53.8	5.46
Wooster a.....	80	28	52.3	2.35	Edinboro * f.....	73	28	50.8	.....
Youngstown.....	80	28	52.2	2.34	Elwood Junction f.....				1.99
Zanesville f.....				1.70	Emporium.....	79	29	52.4	3.94
<i>Oklahoma.</i>					F'ks of Neshaminy.....				56.38
Alva f.....	90	25	64.5	2.20	Frederick.....				4.99
Anadarko f.....	93	32	64.7	2.41	Freeport f.....				2.18
Arapaho f.....	90	29	61.6	1.59	Girardville.....				7.60
Britton f.....				0.66	Grampian.....	76	30	51.4	2.65



## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Pennsylvania—Con.</b>					<b>South Dakota.</b>				
Greensboro f.....	81	38	49.7	0.16	Aberdeen f.....	72	13	45.6	3.18
Hamburg.....	77	31	55.0	0.36	Alexandria f.....	82	23	48.0	3.17
Hollidaysburg.....	82	26	54.5	0.36	Armour f.....	88	25	54.0	1.13
Honesdale.....	73	31	51.1	0.64	Ashcroft f.....	85	15	45.4	0.31
Huntingdon f.....	81	27	54.0	0.93	Brookings f.....	70	23	48.5	1.73
Johnstown f.....	82	29	54.4	2.44	Castlewood f.....	81	10	43.0	2.30
Kennett Square.....	81	31	55.2	0.48	Clark f.....	76	24	44.6	3.11
Kilmer f.....	82	35	58.7	0.30	Cross f.....	80	21	46.3	3.08
Lancaster.....	82	39	55.1	0.36	Faulkton f.....	81	16	46.8	0.10
Lansdale.....	80	39	54.4	0.36	Flandreau f.....	80	25	48.4	2.43
Lebanon.....	74	39	51.1	0.29	Forestburg f.....	87	12	47.9	2.28
Le Roy f.....	74	39	51.1	0.29	Forest City f.....	78	12	45.6	0.48
Lewisburg.....	75	32	53.1	0.02	Fort Meade f.....	85	23	49.5	1.24
Lock Haven f.....	78	27	53.4	0.73	Fort Sully f.....	80	24	50.7	0.45
Lock No. 4 f.....	78	29	55.4	2.28	Frankfort f.....	75	30	49.0	2.99
Lycippus.....	78	29	55.4	2.28	Greenwood f.....	82	29	52.9	1.72
Mahoning f.....	78	29	55.4	2.28	Highmore f.....	85	20	44.8	1.63
Oil City f.....	78	29	55.4	2.28	Hitchcock f.....	87	17	49.6	0.96
Ottaville.....	78	29	55.4	2.28	Hotchkiss f.....	80	27	49.0	3.27
Parker f.....	78	29	55.4	2.28	Howard f.....	83	23	49.2	0.84
Philadelphia f.....	81	37	57.6	0.17	Kimball f.....	83	23	49.2	0.84
Philadelphia f.....	81	37	57.6	0.17	Mellette f.....	80	27	46.1	2.28
Phoenixville.....	79	33	55.5	0.72	Millbank f.....	79	24	46.0	2.28
Point Pleasant.....	80	33	56.0	0.20	Northville f.....	91	16	49.5	0.65
Pottstown.....	80	33	56.0	0.20	Oelrichs f.....	80	25	46.0	1.45
Quakertown.....	78	33	53.1	0.80	Parkston f.....	82	26	49.2	1.36
Reading f.....	78	33	53.1	0.80	Piedmont f.....	82	26	49.2	1.36
Ridgway f.....	78	33	53.1	0.80	Plankinton f.....	82	26	49.2	1.36
Saugertown.....	80	35	51.0	0.20	Rochford f.....	83	16	47.9	0.44
Salem Corners.....	80	30	51.0	0.18	Shiloh f.....	90	20	48.0	0.44
Salisbury f.....	80	30	51.0	0.18	Sioux Falls f.....	79	24	48.6	0.75
Seisholtzville.....	80	36	53.8	0.58	Spearsburg f.....	81	28	49.5	0.81
Selins Grove.....	80	24	50.4	0.33	Tyndall f.....	82	28	51.2	1.81
Shinglehouse.....	78	20	50.0	0.37	Webster f.....	85	16	47.4	3.45
Smithport.....	78	20	50.0	0.37	Wessington f.....	82	28	50.1	1.23
Smiths Corners.....	78	20	50.0	0.37	Wessington Spgs f.....	83	28	52.1	1.24
Somerseset.....	84	26	51.4	0.30	<b>Tennessee.</b>				
South Bethlehem.....	78	37	53.6	0.50	Andersonville f.....	81	29	50.0	1.51
South Eaton.....	76	31	52.0	0.50	Arlington f.....	86	32	50.1	0.34
State College.....	77	32	54.0	0.13	Ashwood f.....	81	33	59.3	0.39
Stoystown f.....	77	32	54.0	0.13	Bolivar f.....	88	30	60.4	0.35
Swarthmore.....	80	34	56.0	0.74	Bristol f.....	78	27	53.3	0.37
Towanda.....	76	30	51.6	0.97	Brownsville f.....	87	26	51.0	1.03
Uniontown.....	80	30	56.0	0.41	Byrdstown f.....	83	30	56.6	0.04
Warren f.....	78	24	48.3	0.81	Carthage f.....	86	34	60.2	0.52
Wellbore f.....	79	33	55.5	0.89	Clarksville.....	86	34	60.2	0.52
West Chester.....	79	33	55.5	0.89	Clinton f.....	86	34	60.2	0.52
West Newton f.....	80	32	53.8	0.58	Columbia.....	84	35	62.4	0.30
Westtown f.....	80	32	53.8	0.58	Covington f.....	88	33	63.2	0.03
Wilkesbarre f.....	80	31	54.1	0.53	Dyersburg f.....	86	32	61.0	0.27
York f.....	83	30	54.7	0.24	Florence Station f.....	85	31	58.4	0.31
<b>Rhode Island.</b>					Franklin f.....	87	27	58.2	0.17
Bristol.....	67	40	54.7	0.82	Greenville f.....	83	29	57.2	0.51
Kingston.....	70	32	52.5	0.14	Hohenwald.....	86	28	52.4	1.82
Lonsdale.....	72	40	56.9	0.84	Jacksboro f.....	86	34	58.6	0.37
Newport.....	72	40	56.9	0.84	Jackson f.....	86	34	58.6	0.37
Pawtucket.....	73	35	54.8	0.70	Johnson City f.....	86	34	58.6	0.37
Providence a.....	72	40	54.6	0.79	Johnsonville.....	86	34	58.6	0.37
Providence c.....	72	35	52.9	0.72	Loudon f.....	87	34	60.6	0.51
<b>South Carolina.</b>					Lynnville f.....	85	30	58.5	0.42
Aiken.....	83	41	64.3	3.60	Milan f.....	85	30	58.5	0.42
Anderson f.....	89	37	65.0	3.85	Newport f.....	85	30	58.5	0.42
Batesburg f.....	88	35	63.3	5.00	Nunnally f.....	87	32	59.4	0.50
Blackville f.....	86	39	65.2	4.03	Palmetto f.....	84	32	60.1	2.82
Blenheim f.....	87	37	64.8	6.35	Riddletown f.....	90	31	59.0	1.34
Branchville.....	89	39	67.2	0.50	Rockwood f.....	90	31	59.0	1.34
Camden f.....	87	37	65.2	2.49	Rogersville f.....	83	40	57.8	1.52
Central f.....	87	37	65.2	2.49	Rugby f.....	80	33	54.2	1.61
Cheraw f.....	87	37	65.2	2.49	St. Bethlehem.....	84	36	61.0	0.57
Cheraw f.....	87	37	65.2	2.49	Springdale f.....	82	25	55.7	2.05
Conway f.....	86	42	64.1	6.19	Trenton.....	86	31	60.0	0.47
Cross Hill f.....	86	42	64.1	6.19	Tullahoma f.....	83	31	59.1	0.60
Edisto f.....	86	42	64.1	6.19	Waynesboro f.....	85	31	58.5	0.60
Effingham f.....	84	35	60.0	5.65	<b>Texas.</b>				
Flint Hill f.....	84	35	60.0	5.65	Albany f.....	90	40	67.9	0.88
Florence f.....	87	40	64.8	6.89	Alice f.....	95	43	76.0	0.00
Georgetown f.....	85	42	66.1	3.62	Arlington f.....	92	38	71.4	0.89
Greenville f.....	84	37	64.0	4.10	Arthur City f.....	92	38	71.4	0.89
Greenwood f.....	90	40	64.1	4.14	Aurora f.....	96	38	69.7	0.96
Hardeeville f.....	86	43	66.8	4.05	Austin f.....	92	45	72.4	1.30
Hollands Store f.....	87	33	60.9	4.89	Austin f.....	92	45	72.4	1.30
Kingstree f.....	90	30	68.8	4.24	Beaumont f.....	87	64	78.4	2.10
Kingstree f.....	90	30	68.8	4.24	Belton f.....	90	44	75.4	1.63
Little Mountain.....	90	42	65.7	5.38	Boerne f.....	93	44	65.8	2.72
Longshore f.....	85	35	60.2	6.27	Brady f.....	90	37	69.6	1.08
McCormick f.....	85	40	64.4	5.05	Brasoria f.....	89	39	72.2	1.00
Mount Carmel f.....	85	40	64.4	5.05	Brenham f.....	92	42	72.4	1.75
Pinopolis f.....	82	45	64.2	4.10	Burnet f.....	84	48	70.9	1.54
Port Royal f.....	85	49	68.8	3.47	Camp Eagle Pass.....	95	37	74.8	0.06
St. Georges f.....	87	40	66.4	2.74	Childress f.....	86	36	64.4	2.41
St. Matthews f.....	88	40	66.0	3.15	Coleman f.....	90	41	70.1	0.17
St. Stephens f.....	82	40	66.0	3.15	College Station.....	90	41	70.1	0.17
Santuck f.....	84	36	60.9	8.34	Columbia f.....	90	38	71.8	0.14
Shaws Fork f.....	98	39	67.7	4.20	Corsicana f.....	86	40	68.0	1.31
Society Hill f.....	83	38	61.6	6.29	Cuerpo f.....	91	38	73.9	0.40
Spartanburg f.....	89	34	62.8	3.53	Dallas f.....	90	33	66.8	0.35
Statesburg f.....	83	43	64.0	4.51	Devine f.....	95	34	70.0	0.29
Timmonsville f.....	85	57	67.9	6.31	Durham f.....	95	34	70.0	0.29
Trenton.....	85	45	65.2	6.31	Duval f.....	97	48	75.5	1.25
Trials f.....	91	39	66.2	3.54					
Watts f.....	87	37	62.4	5.79					
Yorkville.....	85	40	62.4	8.11					

## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<b>Texas—Cont'd.</b>					<b>Virginia—Cont'd.</b>				
Estelle†.....	92	35	69.0	0.88	Buckingham†.....	82	30	56.8	4.41
Flower Bluff†.....	90	40	77.0	0.94	Callville†.....	79	31	56.2	3.99
Forestburg†.....	94	35	66.0	0.00	Charlottesville.....	84	33	58.4	3.72
Fort Brown†.....	97	44	76.8	0.10	Christiansburg†.....	79	27	54.7	3.15
Fort Clark.....	89	42	73.4	0.22	Dale Enterprise†.....	79	27	54.7	2.30
Fort Hancock.....	96	18	63.4	0.00	Hampton.....	83	40	62.4	3.83
Fort McIntosh.....	98	39	77.0	0.00	Hot Springs.....	82	30	51.8	2.50
Fort Ringgold†.....	103	37	77.6	0.16	Irwin†.....	83	30	57.2	3.08
Fort Stockton†.....	98	40	69.0	1.10	Lexington†.....	84	30	57.6	3.74
Fort Worth†.....	98	40	69.0	0.73	Nottoway.....	86	29	58.9	4.22
Fredericksburg†.....	91	34	68.7	1.43	Petersburg†.....	89	33	60.3	3.70
Golindo.....	92	35	69.0	1.00	Richmond (near)†.....	7	37	61.0	4.69
Graham†.....	92	35	69.0	0.57	Richmond†.....	84	32	59.6	3.04
Grape Vine†.....	92	35	69.0	0.57	Rocky Mount†.....	87	37	60.9	3.00
Hale Center†.....	92	35	69.0	0.57	Salem†.....	84	32	59.6	3.04
Hallettsville†.....	91	36	71.8	2.01	Smithville†.....	84	31	58.2	4.37
Happy.....	86	25	59.9	1.33	Spottsville†.....	82	31	57.8	3.96
Hartley†.....	87	15	51.7	0.69	Stanardsville†.....	82	31	57.8	3.96
Haskell†.....	86	25	70.3	0.69	Staunton†.....	82	32	59.7	3.45
Hearne†.....	90	40	69.0	1.56	Stephens City†.....	86	32	57.4	3.18
Hewitt.....	90	40	69.0	0.85	Warsaw†.....	84	36	57.6	3.58
Houston†.....	90	35	74.5	0.09	Whittles Depot†.....	70	30	59.2	3.56
Huntsville†.....	92	40	69.7	0.46	Wytheville†.....	78	31	52.0	3.24
Jefferson*.....	90	32	64.5	0.25	<b>Washington.</b>				
Kent.....	94	42	71.6	2.41	Aberdeen†.....	70	35	49.8	9.25
Lampasas*.....	94	42	71.6	1.25	Anacortes.....	66	29	47.5	4.97
Leakey†.....	90	43	72.6	2.70	Blaine†.....	73	19	47.0	0.88
Llano*†.....	91	39	70.6	1.40	Bridgeport†.....	63	25	40.4	11.47
Longview†.....	92	33	68.6	0.21	Cascade Tunnel†.....	70	29	49.1	1.25
Luling†.....	93	40	72.8	1.28	Centerville†.....	76	30	50.6	5.94
Marshall†.....	89	35	67.6	1.85	Chehalist†.....	76	30	50.6	5.94
Menardville*†.....	89	42	67.9	0.59	Davenport†.....	71	24	45.0	0.60
Midland†.....	99	27	68.6	0.32	East Sound†.....	67	36	49.2	3.66
Mountain Spring†.....	92	35	68.2	0.62	Elbe.....				
New Braunfels†.....	91	40	71.0	1.91	Ellensburg†.....	75	18	45.9	9.93
Orange†.....	88	40	69.6	1.03	Everett.....	72	32	51.0	4.02
Panther.....	91	37	68.6	0.93	Ferry†.....				
Paris†.....	91	37	68.6	0.93	Fort Simcoe.....	74	33	50.8	1.55
Roby†.....	90	30	65.5	2.39	Fort Spokane.....	80	22	49.3	0.33
Rockport*.....	90	46	75.8	0.88	Fort Townsend.....	68	33	48.8	2.00
Rock Springs†.....	103	39	69.8	1.49	Grand Mound*.....	65	32	47.6	6.54
Round Rock†.....	92	40	73.8	1.18	Hunters†.....	63	20	40.6	2.63
San Antonio.....	90	36	71.8	0.96	Index†.....				
San Marcos a†.....				2.05	Kennewick†.....	68	31	54.2	0.54
San Marcos b†.....	86	50	73.4	1.98	Lakeside†.....	83	30	48.1	1.37
Sherman*.....	88	40	69.0	0.20	Lapush†.....	62	34	49.2	8.41
Silver Falls†.....	90	26	63.2	0.20	Madrone*†.....	73	34	50.6	4.74
Sulphur Springs.....	98	43	74.1	0.45	Moxee Valley†.....	77	22	47.4	0.61
Temple†.....	88	40	71.0	2.20	Olga†.....	65	39	49.8	3.98
Tyler†.....	88	38	68.2	0.75	Pine Hill*.....	71	34	49.7	2.79
Victoria*†.....	88	57	76.6	T.	Pullman†.....	77	31	47.2	2.84
Waco†.....	94	40	71.5	0.80	Rosalia†.....	70	27	46.2	3.14
Weatherford†.....	94	39	68.9	0.86	Silver Creek*.....	71	34	48.4	7.76
Wichita Falls†.....	100	33	71.4	0.40	Snohomish†.....	73	34	50.6	4.60
<b>Utah.</b>					Stampepe†.....	67	28	42.5	10.30
Blue Creek*.....	76	28	53.8	1.60	Sunnyside†.....	80	23	49.2	0.66
Cisco†.....	83	24	52.7	0.70	Tacoma†.....	73	33	49.3	5.02
Coalville†.....	74	16	42.6	1.12	Union City*†.....	73	34	47.9	10.47
Corinne*.....	77	30	50.7	0.36	Vashon†.....	72	23	45.0	4.18
Deaeret†.....	85	17	51.2	0.39	Waterville†.....	71	16	43.2	1.18
Fillmore†.....	78	14	53.0	0.41	Wenatchee Lake†.....	70	24	43.2	2.90
Fort Du Cheneo†.....	72	18	48.3	0.34	West Ferndale†.....	65	30	48.2	7.81
Kelton*.....	76	12	46.2	0.34	<b>West Virginia.</b>				
Koosharem.....	79	14	45.3	0.24	Beverly†.....	80	26	53.5	3.00
Laake Station*.....	72	28	47.1	0.85	Blommery†.....	82	29	54.6	2.74
Levan†.....			50.0	0.85	Buckhannon a†.....				
Loa†.....	74	9	43.9	0.49	Buckhannon b†.....	78	25	52.9	3.20
Loose†.....	78	22	51.4	0.03	Burlington†.....	82	25	54.0	2.70
Manti†.....	90	23	54.8	0.20	Central Station†.....				
Moab†.....	81	25	54.8	0.79	Charleston†.....				
Mount Pleasant*†.....	82	24	53.7	0.10	Creston†.....	82	27	53.8	2.50
Ogden a*.....	72	27	50.6	1.00	Davis†.....	85	26	49.0	3.70
Ogden b*.....	72	27	51.9	0.61	Elkhorn†.....	79	28	55.5	2.67
Parowan†.....	78	22	50.6	0.65	Ella†.....	80	35	57.0	1.90
Promontory*.....	78	15	45.0	0.50	Fairmont†.....				
Richfield†.....	78	18	49.4	0.23	Glenville†.....	80	28	54.2	2.31
St. George†.....	74	24	60.9	0.06	Grafton†.....	82	25	55.6	2.32
Singletree*†.....	74	13	45.2	0.04	Harpers Ferry†.....				
Snowville†.....	74	19	46.3	0.54	Hinton†.....				
Soldier Summit†.....	63	15	38.9	0.50	Huntington†.....	82	27	55.5	1.17
Terrace*.....	82	30	57.5	T.	Leachtown†.....				
<b>Vermont.</b>					Madison†.....	80	29	53.9	1.55
Brattleboro.....	69	29	49.8	2.22	Martinsburg†.....	84	33	56.0	3.85
Burlington†.....	68	37	53.0	3.59	Monarch*.....	78	34	54.0	2.57
Cornwall.....	69	33	50.2	3.66	Morgantown a†.....				
Enosburg Falls†.....	74	31	48.6	5.26	Morgantown b†.....	87	24	53.5	3.14
Hartland†.....	70	24	46.5	4.25	New Cumberland†.....	84	28	56.1	1.81
Jacksonville.....	68	26	43.5	5.08	New Martinsville†.....	83	26	56.0	2.40
Norwich*.....	69	28	48.0	3.48	Nuttallburg†.....	88	22	38.4	2.20
St. Johnsbury.....	66	27	47.9	1.77	Phillippi†.....				
Simonsville.....	72	26	45.0	3.80	Point Pleasant†.....	86	29	57.0	1.25
Stratford*†.....	64	31	47.2	3.10	Powellton.....	78	26	51.2	1.82
Vernon*.....	67	30	49.5	4.15	Rowlesburg†.....				
Wells.....	68	31	49.2	3.67	Sandyville†.....	83	23	54.4	1.24
Woodstock.....	71	26	48.2	4.27	Tannery*.....	84	26	54.3	3.00
<b>Virginia.</b>					Weston a†.....				
Abingdon†.....				2.05	Weston b*.....	80	28	55.7	3.30
Alexandria.....	85	34	57.4	2.91	Wheeling a†.....				
Ashland†.....	85	33	57.4	4.84	Wheeling b†.....	81	31	56.6	1.63
Avon†.....	88	34	58.1	3.42	<b>Wisconsin.</b>				
Bedford City.....	81	37	57.3	4.19	Amherst.....	73	23	47.4	2.95
Big Stone Gap†.....	88	25	53.0	1.87	Ashland†.....	69	31	48.3	7.68
Birdsneat*†.....	84	41	61.7	5.50	Baraboo†.....				
Blacksburg.....	79	28	52.7	2.82	Barron†.....	70	23	45.8	4.73
Buchanan†.....				2.90	Bayfield.....	70	32	47.4	4.99



## Meteorological record of voluntary observers, &amp;c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
Wisconsin—Cont'd.	o	o	o	Ins.	Wisconsin—Cont'd.	o	o	o	Ins.
Beaver Dam.....	73	28	51.8	3.21	Port Washington..	78	28	48.7	1.72
Belleville.....	75	12	48.0	3.65	Prairie du Chien...	83	20	47.4	2.57
Beloit.....	73	28	50.9	1.83	Racine *10.....	73	29	50.0	...
Black River Falls f.	74	18	47.6	2.54	Royalton.....	75	24	48.6	3.23
Centralia.....	74	19	48.6	2.04	Sharon f.....	73	25	48.8	1.63
Chilton.....	74	28	50.0	3.82	Shawano.....	74	22	47.0	2.93
Chippewa Falls f.	...	...	...	2.94	Sheboygan *10...	70	30	48.4	...
Columbus.....	80	22	49.5	1.05	Spooner f.....	70	23	47.6	5.31
Crandon f.....	69	25	47.4	3.90	Stevens Point f.	73	21	48.6	3.60
Delavan f.....	74	22	49.0	2.11	Sturgeon B. Canal*10	68	29	48.0	...
De Pere f.....	73	29	49.1	4.01	Tomahawk Lake f.	73	21	45.3	3.29
Eau Claire.....	75	23	49.1	2.90	Two Rivers *10...	70	30	48.0	...
Florence f.....	70	19	43.9	2.58	Valley Junction f.	76	17	48.2	2.24
Fond du Lac f.....	76	23	48.8	2.80	Viroqua.....	73	28	48.7	3.43
Grantsburg f.....	76	25	47.0	3.72	Watertown f.....	74	20	47.4	1.61
Hartford f.....	...	...	...	2.96	Waukesha f.....	73	29	49.8	2.37
Harvey f.....	74	24	49.3	2.56	West Bend.....	72	32	...	2.50
Hayward f.....	72	19	45.2	3.78	Westfield f.....	79	22	48.6	1.98
Hillsboro.....	75	19	47.6	2.59	Weston * f.....	74	24	45.6	4.22
Janesville.....	75	25	49.6	2.17	Whitehall.....	76	30	50.4	1.69
Kenosha *10...	78	40	56.0	...	Wyoming.	...	...	...	...
Koepenick * f1...	72	30	40.4	3.20	Big Horn Ranch f.	74	8	40.4	0.18
Lancaster f.....	76	27	48.2	2.57	Camp Pilot Butte f.	78	6	43.6	0.18
Lincoln f.....	...	...	...	3.97	Fort Laramie f.....	91	8	51.2	0.17
Madison f.....	73	31	50.4	1.77	Fort McKinney....	82	15	48.5	T.
Manitowoc f.....	74	29	47.2	2.97	Fort Washakie....	75	16	45.8	0.09
Meadow Valley f.	75	10	44.6	2.49	Fort Yellowstone f.	73	...	...	0.89
Medford f.....	71	17	46.6	3.14	Laramie.....	70	16	44.4	0.09
Menomonie.....	76	17	46.2	4.33	Lusk f.....	73	16	47.3	0.14
Neillsville f.....	70	20	47.8	2.97	Saratoga f.....	69	16	42.8	0.25
New Holstein f.	72	26	49.7	3.33	Sheridan.....	85	18	45.6	0.05
Oconomowoc f.	74	26	50.8	1.98	Sundance.....	74	19	44.9	2.75
Oconto.....	75	25	48.6	2.60	Mexico.	...	...	...	...
Osceola f.....	73	22	46.7	4.69	Ciudad P. Diaz....	94	43	76.0	0.07
Oshkosh f.....	74	26	49.8	3.48	Leon de Aldamas..	81	45	64.2	0.20
Pepin.....	68	26	47.7	2.99	Mexico.....	75	44	60.0	0.58
Pine River.....	76	25	50.4	2.50	Puebla.....	74	48	61.7	1.88
Portage f.....	...	...	...	3.05	Vera Cruz.....	89	70	78.3	3.71

## Reports received too late to be used in general discussion of weather for October, 1894.

Alabama.	...	...	...	...	Mississippi.	...	...	...	...
Thomasville f.....	90	41	65.8	1.42	Corinth f.....	92	31	60.6	0.00
Florida.	...	...	...	...	Thornton * f.....	88	45	66.7	1.03
Tallahassee.....	...	...	...	7.43	Missouri.	...	...	...	...
Georgia.	...	...	...	...	Shelbina.....	...	...	...	1.40
Gillville *1.....	85	46	64.6	2.43	Vermont *1.....	85	29	56.1	1.33
Kansas.	...	...	...	...	Nebraska.	...	...	...	...
Coffeyville *1.....	90	30	63.9	3.00	Ravenna.....	85	26	51.8	2.49
Emporia.....	83	32	58.6	2.80	North Dakota.	...	...	...	...
Garden City.....	83	23	56.0	0.12	Power.....	74	24	46.2	3.02
Halstead *.....	85	26	58.3	1.25	Utah.	...	...	...	...
Lawrence 1.....	88	28	58.6	3.99	Heber.....	74	18	45.4	1.70
Phillipsburg.....	...	...	...	1.12	Logan.....	74	20	50.3	0.67
					Thistle.....	75	21	49.0	0.18

## Received too late for publication in September, 1894.

California.	...	...	...	...	Kentucky.	...	...	...	...
Davisville b.....	99	48	73.2	0.98	Paducah a.....	...	...	...	3.05
Green Valley.....	...	...	...	0.89	Michigan.	...	...	...	...
Hendersons Ranch.	...	...	...	0.70	Hastings.....	90	33	62.8	2.12
Mount Frazier.....	...	...	...	0.65	Minnesota.	...	...	...	...
Point Lobos.....	82	49	58.0	1.40	Granite Falls.....	96	24	63.1	0.93
West Point.....	...	...	...	0.95	Missouri.	...	...	...	...
Colorado.	...	...	...	...	Marble Hill.....	39	...	...	4.75
Greeley.....	...	...	...	0.97	Montana.	...	...	...	...
Lake Moraine.....	66	26	46.4	0.19	Musselshell.....	89	26	55.4	...
Paonia.....	...	...	...	0.29	Nebraska.	...	...	...	...
St. Cloud.....	...	...	...	2.90	Ough.....	...	...	...	1.06
Delaware.	...	...	...	...	New York.	...	...	...	...
Milford.....	94	52	71.8	4.16	Massena *1.....	85	30	65.1	3.80
Florida.	...	...	...	...	North Carolina.	...	...	...	...
Tallahassee.....	...	...	...	6.80	Raleigh *1.....	92	56	74.5	4.30
Georgia.	...	...	...	...	Oregon.	...	...	...	...
Macon b.....	...	...	...	1.59	Springfield * f.	93	42	59.5	2.53
Illinois.	...	...	...	...	South Dakota.	...	...	...	...
Chester.....	...	...	...	4.21	Millbank.....	...	...	...	1.70
Dixon.....	97	34	67.2	3.20	Tennessee.	...	...	...	...
Indiana.	...	...	...	3.73	Columbia.....	...	...	...	3.05
Iowa.	...	...	...	...	Johnsonville.....	...	...	...	2.81
Carroll.....	94	31	62.6	3.29	Texas.	...	...	...	...
Greenfield.....	95	39	66.7	5.11	Sulphur Springs...	100	48	78.6	3.42
Mason City.....	93	25	63.9	1.78	West Virginia.	...	...	...	...
Kansas.	...	...	...	...	Monarch *1.....	92	45	69.9	3.68
Collyer * f.....	100	35	66.6	0.50	Wisconsin.	...	...	...	...
Grinnell * f.....	100	48	66.9	0.00	West Bend.....	93	32	...	6.30

## EXPLANATION OF SIGNS.

\*Extremes of temperature from observed readings of dry thermometer.

†Weather Bureau instruments.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

1 Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. + 4.

2 Mean of 8 a. m. + 8 p. m. + 2.

3 Mean of 7 a. m. + 7 p. m. + 2.

4 Mean of 6 a. m. + 6 p. m. + 2.

5 Mean of 7 a. m. + 2 p. m. + 2.

6 Mean from readings at various hours reduced to true daily mean by special tables.

7 Mean from hourly readings of thermograph.

8 Mean of 7 a. m. + 2 p. m. + 9 p. m. + 3.

9 Mean of sunrise and noon.

10 Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An Italic letter following the name of a station, as "Livingston a," "Livingston b," indicates that two or more observers, as the case may be, are reporting from the same station. A small Roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "a" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

Corrections: Illinois, Mount Carmel, September, 1894, make precipitation 3.34, instead of 2.34. Indiana, Lafayette, September, 1894, make precipitation 6.88, instead of 6.63. Michigan, Harrison, late report for September, 1894, make minimum temperature 15°, instead of 24°. Virginia, Smithville, all temperature data for June, July, and August, 1894, doubtful.

NOTE.—The following change has been made in names of stations: New York, Factoryville changed to Waverly.

TABLE III.—Data from Canadian stations for the month of October, 1894.

Station.	Pressure.			Temperature.		Precipitation.		Prevailing direction of wind.
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Total.	Departure from normal.	
	Inches.	Inches.	Inches.	°	°	Inches.	Inches.	
St. John's, N. F.....	29.78	29.93	-.01	42.4	-3.4	6.36	...	no.
Sydney, N. S.....	29.92	29.98	+.02	45.0	-0.4	5.47	+1.17	sw.
Grindstone, G. St. L....	29.88	29.91	...	45.6	...	4.21	...	n.
Halifax, N. S.....	29.86	29.99	+.01	48.2	+2.2	3.88	-1.51	n.
Grand Manan, N. B.....	29.92	29.97	...	48.8	...	3.88	-1.80	sw.
Yarmouth, N. S.....	29.90	29.98	...	49.0	+1.5	3.43	-0.60	nw.
Saint Andrews, N. B....	29.89	29.94	...	47.3	...	3.80	+0.45	nw.
Charlottetown, P. E. I...	29.92	29.96	...	47.2	...	3.78	-0.70	w.
Chatham, N. B.....	29.93	29.95	-.01	44.6	+4.1	5.16	+1.47	w.
Father Point, Que.....	29.88	29.91	-.05	41.1	+2.1	4.42	+1.80	w.
Quebec, Que.....	29.59	29.93	-.06	44.2	+3.2	4.50	+0.85	nw.
Montreal, Que.....	29.71	29.92	-.08	47.2	+3.7	4.03	+0.42	w.
Rockliffe, Ont.....	29.36	29.88	-.14	44.2	+5.2	4.44	+1.74	nw.
Kingston, Ont.....	29.62	29.94	-.09	50.0	+4.0	4.01	+1.01	sw.
Toronto, Ont.....	29.56	29.94	-.10	48.6	+3.1	2.35	+0.06	sw.
White River, Ont.....	28.53	29.90	...	38.8	+2.8	4.13	+1.69	s.
Port Stanley, Ont.....	29.31	29.95	-.08	49.2	...	3.49	+0.21	w.
Saugeen, Ont.....	29.20	29.92	-.08	48.5	+3.5	2.50	+1.31	w.
Parry Sound, Ont.....	29.20	29.90	-.11	46.8	+4.3	4.90	+0.58	e.
Port Arthur, Ont.....	29.12	29.83	-.17	42.4	+4.9	5.27	+2.58	nw.
Winnipeg, Man.....	29.00	29.84	-.15	37.6	+1.1	1.79	+0.06	s.
Minneapolis, Man.....	28.00	29.84	-.13	36.6	+3.1	1.11	+0.45	nw.
Qu'Appelle, Assiniboia..	27.58	29.88	-.09	36.0	+0.5	1.74	+0.72	nw.
Medicine Hat, Assiniboia	27.51	29.83	-.13	41.6	-0.4	0.81	+0.37	s.
Swift Current, Assiniboia	27.27	29.89	-.10	38.0	0.0	0.40	-0.83	w.
Calgary, Alberta.....	26.25	29.82	-.14	39.1	+0.1	0.11	-0.25	w.
Prince Albert, Sask.....	28.32	29.87	...	34.1	...	0.80	...	w.
Edmonton, Alberta.....	27.47	29.84	-.12	37.5	-2.5	1.86	+1.29	sw.
Battleford, Saskatchewan	28.06	29.82	...	36.8	...	0.41	...	w.
Spences Bridge, B. C.....	29.08	29.91	...	47.0	...	0.75	...	w.
Hamilton, Bermuda.....	29.87	30.03	+.01	74.6	...	8.88	...	no.
Anticosti, G. St. L.....	29.26	29.89	-.07	41.4	+2.4	4.71	...	s.
September, 1894.	...	...	...	...	...	...	...	...
Anticosti, G. St. L.....	29.96	29.99	+.07	47.9	-2.3	3.46	...	nw.
Bird Rocks, G. St. L....	29.94	30.06	...	52.2	...	1.34	...	nw.
Calgary, Alberta.....	26.32	29.85	-.05	46.2	-3.3	1.30	+0.40	nw.

TABLE IV a.—Hourly sunshine as deduced from sunshine recorders, October, 1894.

Station.	Instrument.	Percentage for each hour of local mean time ending with the respective hour.																Monthly summary.			
		A. M.								P. M.								Instrumental record.			
		5	6	7	8	9	10	11	Noon.	1	2	3	4	5	6	7	8	Actual.	Possible.	Per cent of possible.	Personal estimate.
Baltimore, Md.	T.			56	52	51	55	63	61	61	61	61	61	52	71			Hours.	Hours.		
Bismarck, N. Dak.	P.			42	50	55	62	65	66	72	72	66	60	54	48			201.5	347.3	58	54
Boston, Mass.	T.			32	40	48	52	54	60	60	51	42	44	44	49			204.3	336.8	61	59
Buffalo, N. Y.	T.			25	26	47	58	65	63	64	54	47	45	26	13			165.3	343.0	48	36
Chicago, Ill.	T.			32	26	43	50	55	59	49	46	37	35	33	49			160.3	343.1	47	32
Cincinnati, Ohio	P.			80	70	71	67	69	74	72	72	73	72	73	71			146.6	343.1	43	41
Cleveland, Ohio	P.			38	42	51	57	57	62	61	65	63	62	50	42			244.8	346.5	71	60
Columbus, Ohio	P.			49	50	52	56	65	66	69	65	63	54	53	50			189.5	343.2	55	55
Denver, Colo.	P.			78	88	90	91	91	91	95	92	90	88	79	84			201.0	346.0	58	56
Des Moines, Iowa	T.			50	46	56	60	66	70	69	63	65	58	49	51			306.8	345.8	89	69
Detroit, Mich.	T.			34	37	50	60	60	57	50	57	55	50	30	20			206.5	342.8	60	56
Dodge City, Kans.	P.			50	74	84	90	93	93	90	91	85	77	70	70			158.9	343.0	46	39
Eastport, Me.	P.			37	37	44	43	41	43	45	47	46	41	40	29			300.3	347.3	86	77
Galveston, Tex.	P.			25	61	88	88	88	92	90	87	94	92	85	76			142.8	340.7	42	33
Helena, Mont.	P.			40	38	52	63	67	61	64	69	63	61	63	59			305.8	355.0	86	86
Kansas City, Mo.	T.			67	65	73	75	80	78	79	80	81	81	72	70			198.7	336.6	59	49
Key West, Fla.	T.			15	54	57	65	70	84	83	79	72	67	61	50			261.6	347.6	75	71
Little Rock, Ark.	T.			33	80	78	82	86	87	87	85	87	80	81	88			246.4	358.1	69	47
Louisville, Ky.	T.			57	55	55	69	77	75	74	75	77	72	67	84			292.3	350.0	84	67
Memphis, Tenn.	P.			67	72	84	87	91	92	91	91	89	82	82	86			239.2	348.1	69	58
New Haven, Conn.	T.			54	56	62	67	68	65	61	57	57	55	39	39			302.7	349.9	87	86
New Orleans, La.	T.																	198.3	343.1	58	50
New York, N. Y.	T.			11	37	57	67	71	69	65	65	63	51	31	28			183.8	343.1	54	48
Philadelphia, Pa.	T.			41	46	51	51	59	72	70	68	62	55	46	63			200.0	345.5	58	44
Portland, Me.	T.			16	40	50	58	63	61	66	59	53	48	41	38			173.9	341.0	51	37
Portland, Oreg.	P.			0	5	12	23	33	33	40	40	43	41	43	48			102.1	340.3	30	31
Rochester, N. Y.	T.			37	30	40	51	51	48	49	42	42	34	25	10			134.2	343.7	39	42
St. Louis, Mo.	T.			52	57	66	75	76	75	76	80	81	76	67	62			246.8	347.2	71	65
Salt Lake City, Utah	T.			52	52	72	75	79	84	85	86	78	77	64	55			251.3	343.8	73	68
San Diego, Cal.	P.			0	28	33	47	69	79	85	86	89	90	93	88			227.9	317.5	72	69
San Francisco, Cal.	P.			0	25	46	60	66	76	76	83	87	79	76	71			233.0	347.3	67	64
Santa Fe, N. Mex.	P.			67	86	84	86	86	95	94	93	91	80	80	84			313.8	349.4	90	86
Savannah, Ga.	P.			50	67	82	84	86	81	75	78	80	78	71	61			272.3	352.6	77	68
Seattle, Wash.	P.			34	40	57	59	58	54	46	50	54	52	52	53			172.0	336.3	51	35
Tucson, Ariz.	P.			100	88	87	88	90	90	89	89	93	83	72	77			306.1	352.3	87	77
Vicksburg, Miss.	T.			83	78	81	87	93	93	92	97	99	95	94	93			321.0	352.6	91	89
Washington, D. C.	P.			0	41	46	49	59	61	62	64	64	58	50	70			197.4	346.7	57	54
Wilmington, N. C.	T.			84	59	61	75	82	78	73	72	69	70	59	52			245.1	350.8	70	69

\* Instrument out of order.

† Record for 25 days.

TABLE IV b.—Hourly precipitation, October, 1894.

Station.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Total.
Atlanta, Ga.*	0.03	0.04	0.02	0.02	0.08	0.08	0.06	0.03	0.08	0.10	0.02	0.04	0.01	0.14	0.16	0.09	0.05	0.07	0.16	0.12	0.07	0.06	0.06	0.09	1.68
Baltimore, Md.	0.37	0.59	0.35	0.46	0.30	0.16	0.13	0.07	0.21	0.04	0.04	0.07	0.04	0.02	0.01	0.01	0.03	0.11	0.01	0.04	0.07	0.15	0.46	3.80	
Bismarck, N. Dak.	0.05	0.03	0.02	0.02	0.03	0.02	0.04	0.07	0.05	0.02	0.04	T.	0.03	0.07	0.01	0.01	0.03	T.	0.01	0.01	0.01	0.06	0.08	0.82	
Boston, Mass.	0.38	0.27	0.32	0.15	0.10	0.05	0.25	0.15	0.41	0.22	0.19	0.18	0.13	0.09	0.19	0.15	0.50	0.11	0.14	0.21	0.27	0.27	0.18	0.19	5.03
Buffalo, N. Y.*	0.24	0.26	0.20	0.27	0.30	0.24	0.27	0.24	0.13	0.12	0.07	0.02	0.17	0.06	0.13	0.10	0.25	0.36	0.31	0.48	0.16	0.28	0.21	0.22	5.09
Chicago, Ill.	T.	T.	T.	T.	T.	T.	0.02	T.	0.04	0.03	0.12	0.01	T.	T.	T.	T.	T.	T.	T.	0.01	0.01	T.	T.	T.	0.52
Cincinnati, Ohio	0.01	0.00	0.00	0.00	0.15	0.03	0.03	0.02	0.14	0.00	0.03	0.02	T.	0.01	0.01	0.01	0.01	T.	0.01	0.01	0.06	0.13	0.06	0.02	0.80
Cleveland, Ohio	0.13	0.05	0.02	0.01	0.09	0.16	0.04	0.03	0.16	0.07	0.15	0.14	0.08	0.14	0.19	0.14	0.12	0.06	0.06	0.19	0.18	0.19	0.45	0.21	3.14
Denver, Colo.	T.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T.	T.	0.00	T.	0.03	0.06	0.02	0.00	0.00	0.01	0.07	T.	0.19	
Detroit, Mich.	0.39	0.14	0.30	0.01	0.02	0.11	0.18	0.10	0.04	0.06	0.06	0.11	0.26	0.06	0.09	0.02	0.06	0.10	0.26	0.43	0.17	0.16	0.06	0.14	3.37
Dodge City, Kans.	0.00	0.00	0.00	0.00	0.00	0.00	0.02	T.	0.00	0.00	0.00	0.00	0.04	0.01	0.00	T.	0.15	T.	0.00	0.28	0.10	0.02	0.00	0.00	0.62
Duluth, Minn.	0.11	0.24	0.15	0.27	0.26	0.29	0.30	0.72	0.34	0.06	0.05	T.	0.01	0.03	0.06	0.15	0.06	0.20	0.33	0.30	0.21	0.22	0.20	0.40	4.89
Eastport, Me.	0.06	0.06	0.03	0.07	0.09	0.13	0.21	0.24	0.14	0.28	0.21	0.07	0.03	0.05	0.09	0.10	0.03	0.07	0.09	0.06	0.16	0.07	0.06	0.04	2.45
Galveston, Tex.	0.01	0.07	0.06	0.00	0.00	0.00	0.00	0.00	0.00	T.	0.02	0.16	T.	T.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.15	0.50
Indianapolis, Ind.	0.22	0.13	0.07	0.00	0.00	0.02	0.00	0.02	T.	0.01	0.01	0.03	0.01	0.03	0.00	0.14	0.08	0.12	0.30	0.08	0.21	0.63	0.14	0.27	5.22
Jacksonville, Fla.	0.09	0.04	0.13	0.02	0.01	0.02	0.02	0.03	0.02	0.02	0.01	T.	0.09	0.02	0.02	0.02	T.	0.12	0.25	1.68	0.39	0.20	0.04	3.24	
Jupiter, Fla.	0.40	0.50	0.22	0.20	0.08	0.30	0.16	0.10	0.02	0.00	0.00	T.	0.03	0.95	0.53	1.09	0.13	0.00	0.07	0.01	0.27	0.46	0.41	6.28	
Kansas City, Mo.	0.05	0.05	0.01	T.	T.	0.02	0.05	0.11	0.01	0.08	0.01	T.	0.01	0.02	0.02	T.	0.01	0.04	T.	T.	0.07	0.42	0.47	1.45	
Key West, Fla.*	0.57	0.28	0.12	0.06	0.15	0.01	0.09	0.30	0.18	0.02	T.	0.12	0.08	0.09	0.03	0.05	0.02	T.	0.15	1.07	1.18	1.03	0.04	6.91	
Louisville, Ky.	0.00	0.12	0.04	0.02	0.01	0.02	0.09	0.08	0.01	0.03	T.	0.02	0.10	0.05	0.00	0.07	0.08	0.11	0.05	0.07	0.07	0.13	0.03	T.	1.20
Marquette, Mich.	0.07	0.09	0.19	0.15	0.04	0.09	0.16	0.04	0.04	0.06	0.06	0.06	0.04	0.03	0.18	0.05	0.04	0.05	0.18	0.07	0.13	0.08	0.05	0.03	2.00
Memphis, Tenn.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T.	T.	0.00	0.00	0.01	0.15	T.	T.	0.01	T.	0.00	0.38	0.55
Milwaukee, Wis.	0.02	0.02	T.	T.	T.	T.	0.32	0.04	0.01	0.14	0.26	0.23	0.15	0.08	0.10	0.08	0.05	0.07	0.10	0.05	0.04	0.05	0.13	0.07	2.05
Nantucket, Mass.	0.44	0.45	0.46	0.54	0.54	0.40	0.31	0.74	0.63	1.08	0.65	0.24	0.11	0.21	0.33	0.17	0.28	0.30	0.24	0.23	0.30	0.31	0.17	0.18	9.31
Nashville, Tenn.	0.00	0.00	0.00	0.00	0.00	0.09	T.	0.01	0.18	0.04	T.	0.01	0.04	T.	0.01	0.04	T.	T.	0.01	T.	0.04	0.04	0.03	T.	0.53
New Orleans, La.*																									
New York, N. Y.	T.	0.09	0.47	0.50	0.35	0.21	0.07	0.05	0.26	0.48	0.33	0.30	0.25	0.33	0.09	0.16	0.20	0.36	0.34	0.44	0.30	0.17	0.05	0.03	5.81
Norfolk, Va.	0.04	0.05	0.54	0.45	0.20	0.07	0.10	0.06	0.09	0.04	0.01	T.	0.07	0.06	0.17	0.29	0.65	0.32	0.47	0.79	0.86	0.45	0.04	0.06	5.98
Philadelphia, Pa.	0.26	0.26	0.24	0.13	0.21	0.12	0.54	0.46	0.19	0.30	0.14	0.27	0.21	0.02	0.01	0.01	0.01	0.04	0.04	0.13	0.07	0.11	0.17	0.95	3.95
Pittsburg, Pa.	0.15	0.25	0.03	0.04	0.07	0.04	T.	0.05	0.01	0.00	T.	0.00	T.	0.03	0.05	0.08	0.08	0.03	0.20	0.34	0.07	0.20	0.05	0.05	1.72
Portland, Me.	0.04	0.17	0.30	0.84	0.04	0.07	0.02	0.01	0.06	0.10	0.07	0.41	0.43	0.27	0.19	0.11	0.21	0.28	0.15	0.14	0.13	0.30	0.12	0.15	4.65
Portland, Oreg.	0.04	0.05	0.05	0.03	0.03	0.06	0.11	0.14	0.18	0.33	0.22	0.08	0.04	0.03	0.07	0.24	0.20	0.30	0.27	0.25	0.28	0.22	0.18	0.11	3.55
Rochester, N. Y.	0.03	0.09	0.24	0.14	0.30	0.21	0.23	0.16	0.30	0.19	0.22	0.17	0.06	0.06	0.04	0.02	0.07	0.11	0.04	0.01	0.06	0.03	0.01	0.08	2.86
St. Louis, Mo.	0.02	T.	0.06	0.13	0.04	T.	T.	T.	0.01	0.02	0.03	0.14	0.17	0.02	0.11	0.05	0.01	T.	0.24	0.04	T.	0.03	0.10	0.01	1.23
St. Paul, Minn.	0.25	0.49	0.50	0.06	0.37	0.43	0.11	0.03	0.03	T.	0.01	0.08	0.02	0.01	0.03	0.04	0.06	0.16	0.33	0.41	0.69	0.11	0.06	0.20	4.47
Salt Lake City, Utah.	0.12	0.18	0.02	0.04	0.04	0.12	0.05	0.09	0.13	0.07	0.02	0.01	0.02	0.01	T.	0.01	0.01	T.	0.01	T.	0.13	0.08	0.03	0.04	1.23
San Diego, Cal.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T.	T.	T.	T.	T.	T.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	T.
San Francisco, Cal.	0.00	0.01	0.03	0.03	0.07	0.05	0.27	0.20	0.11	0.30	0.43	0.05	0.06	0.04	0.04	0.03	0.00	0.00	0.00	0.00	0.00	T.	0.01	0.01	1.73
Savannah, Ga.	0.03	0.01	T.	0.12	0.09	0.36	0.37	0.27	0.41	0.28	0.24	0.08	0.16	T.	T.	0.04	0.04	0.05	0.07	0.06	T.	0.08	0.38	0.02	3.17
Seattle, Wash.	0.17	0.16	0.10	0.16	0.09	0.10	0.11	0.25	0.26	0.21	0.21	0.26	0.18	0.19	0.21	0.23	0.18	0.05	0.12	0.02	0.03	0.14	0.06	0.09	3.79
Vicksburg, Miss.	0.15	0.39	0.17	0.04	0.01	0.59	0.15	T.	T.	0.00	T.	T.	T.	T.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.56
Washington, D. C.	0.40	0.29	0.55	0.19	0.15	0.07	0.07	0.03	0.04	0.02	0.03	0.04	0.02	0.04	0.04	T.	T.	0.11	0.07	0.04	0.14	0.18	0.16	0.32	3.01
Wilmington, N. C.	0.20	0.03	0.01	T.	T.	0.00	0.01	0.03	0.08	0.02	0.03	0.17	0.17	0.23	0.59	0.37	1.49	0.47	0.02	T.	T.	0.02	0.25	0.40	4.58



TABLE V.—Mean temperature for each hour of seventy-fifth meridian time, October, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	63.7	62.6	62.1	61.1	60.2	59.4	58.6	58.3	60.8	65.4	69.6	72.5	75.1	77.2	78.5	79.8	80.0	78.6	76.4	72.8	69.9	67.8	66.3	65.1	66.4
Albany, N. Y.	49.7	49.3	49.4	49.2	48.6	48.2	48.4	49.6	51.3	53.2	54.9	56.4	57.4	58.4	58.3	58.3	57.2	55.9	54.4	53.3	51.3	51.7	51.1	50.4	52.8
Alpena, Mich.	45.3	44.8	44.4	44.3	43.9	43.9	44.1	44.6	46.0	47.2	48.4	49.9	50.9	51.7	51.9	51.7	50.9	50.1	48.9	48.0	47.5	45.9	45.7	47.4	47.4
Amarillo, Tex.	53.6	54.5	53.8	52.8	51.8	50.7	49.8	49.2	49.9	54.5	59.2	62.3	65.6	68.1	69.9	70.4	70.0	69.7	68.1	63.8	61.7	59.5	58.0	56.9	59.4
Atlanta, Ga.	59.1	58.4	57.5	56.4	55.4	54.4	54.1	55.5	58.5	61.8	64.6	67.2	69.1	70.1	71.1	71.4	70.9	68.7	66.3	64.5	63.4	62.0	60.6	59.7	62.5
Augusta, Ga.	59.5	58.8	57.9	57.2	56.5	55.9	56.0	57.8	62.2	66.2	69.4	71.7	73.3	74.1	74.6	74.8	73.7	70.7	67.9	65.1	63.5	62.0	60.6	59.6	64.5
Baker City, Oreg.	43.2	41.9	41.1	40.8	39.6	39.4	39.0	38.0	38.0	38.9	42.0	46.5	49.5	52.2	54.4	55.6	56.3	56.7	55.4	53.0	50.0	47.7	46.1	44.3	46.2
Baltimore, Md.	54.2	53.7	53.1	52.8	52.8	52.0	52.1	53.9	56.0	58.2	60.2	62.0	62.7	63.2	63.5	63.4	62.2	60.6	58.9	57.8	56.8	55.8	54.8	53.6	57.3
Bismarck, N. Dak.	40.3	39.5	39.1	38.6	38.0	37.3	37.0	36.6	37.0	39.6	44.1	47.6	50.7	53.6	56.6	59.6	62.4	65.8	69.0	72.3	75.6	78.9	82.2	85.5	74.3
Boston, Mass.	50.9	50.6	50.0	49.8	49.8	49.6	50.4	51.6	53.3	54.7	56.5	57.4	57.5	57.8	57.9	58.8	58.1	55.0	54.1	53.5	53.0	52.5	51.8	51.4	53.4
Buffalo, N. Y.	52.1	51.7	51.8	51.3	51.3	50.9	51.0	52.1	53.7	55.3	56.8	57.8	58.1	58.6	58.8	58.7	57.8	56.3	55.2	54.2	53.5	52.9	52.5	52.5	54.4
Charleston, S. C.	65.0	64.5	64.0	63.5	62.9	62.5	62.5	64.1	66.5	69.0	71.1	72.5	73.5	73.9	73.5	72.8	71.8	70.3	68.5	67.3	66.0	64.6	63.5	62.4	67.7
Charlotte, N. C.	57.1	56.3	55.6	54.8	54.0	53.5	53.3	55.5	58.0	60.9	63.2	65.2	66.6	67.7	68.1	67.8	67.2	64.9	63.2	61.5	60.2	59.5	58.1	57.2	60.4
Cheyenne, Wyo.	42.6	42.4	42.1	42.2	42.3	41.9	41.2	41.2	43.8	49.2	53.3	55.5	56.8	58.2	59.0	59.6	59.2	58.1	54.9	50.9	47.8	45.9	44.4	43.2	49.0
Chicago, Ill.	50.6	50.1	50.0	49.8	49.8	49.6	49.0	48.6	49.3	50.9	52.3	53.6	54.7	55.1	55.6	55.7	55.7	55.3	54.5	53.9	53.2	52.5	51.9	51.2	52.1
Cincinnati, Ohio	54.6	53.6	53.0	52.4	51.3	50.6	50.1	50.3	52.1	54.7	57.3	60.1	62.2	63.6	64.8	65.1	64.9	62.3	60.0	58.7	57.2	56.0	55.0	54.4	57.4
Cleveland, Ohio	51.6	51.4	50.6	49.7	48.7	48.5	48.5	49.7	51.6	54.1	56.7	59.3	61.8	63.9	65.7	67.3	68.7	70.3	71.8	73.2	74.5	75.8	77.1	78.4	67.7
Columbus, Ohio	51.3	50.4	49.8	49.1	48.7	48.4	48.3	49.0	51.6	54.2	56.6	59.8	62.5	64.7	66.3	67.8	69.3	70.8	72.3	73.7	75.0	76.3	77.6	78.9	54.8
Denver, Colo.	49.2	48.4	47.5	46.6	45.7	45.1	44.5	43.7	43.2	47.0	54.1	59.9	62.6	64.7	66.0	66.6	66.7	66.2	64.6	61.5	58.3	55.6	53.5	51.9	54.6
Des Moines, Iowa	50.5	49.9	48.9	47.9	47.0	46.5	45.8	45.6	47.3	50.8	54.4	58.8	62.6	66.4	69.6	72.8	76.0	79.2	82.4	85.6	88.8	92.0	95.2	98.4	74.3
Detroit, Mich.	49.6	49.2	48.9	48.3	47.7	47.3	46.9	47.9	49.2	51.3	53.1	54.3	55.6	56.4	56.6	56.8	56.2	55.2	53.9	52.7	51.8	51.2	50.7	50.1	51.7
Dodge City, Kans.	53.4	52.5	51.4	50.4	49.4	48.2	47.5	46.6	48.7	54.8	60.6	64.6	67.1	68.9	70.7	71.6	71.5	70.8	69.6	68.2	66.9	65.6	64.3	63.0	65.6
Duluth, Minn.	45.3	45.2	44.9	44.6	44.4	44.0	43.4	43.5	44.0	44.9	45.9	47.3	48.5	49.3	50.0	50.3	50.1	49.5	48.4	47.6	47.1	46.6	46.5	46.5	48.3
Eastport, Me.	46.4	46.1	45.7	45.6	45.5	45.3	45.2	47.4	48.6	49.9	51.1	51.5	51.5	51.4	51.3	50.5	49.8	49.2	48.7	48.5	48.0	47.4	47.0	46.3	48.3
El Paso, Tex.	62.1	60.7	59.4	58.4	57.7	56.5	55.7	54.6	55.0	59.4	64.2	68.4	71.8	74.5	76.4	78.1	79.0	78.9	76.5	71.5	68.6	66.8	64.7	63.2	65.9
Fort Smith, Ark.	58.0	56.4	54.9	54.0	53.1	52.1	51.5	52.0	55.0	59.4	63.9	68.0	70.5	72.6	73.9	75.0	75.2	73.6	70.2	67.4	65.0	62.9	61.1	59.2	62.7
Galveston, Tex.	73.2	72.8	72.7	72.2	71.8	71.2	71.2	72.0	73.2	74.5	75.4	76.4	76.3	76.6	76.9	76.9	76.6	75.9	75.0	74.8	74.5	74.2	73.5	73.1	74.0
Grand Haven, Mich.	49.9	49.5	49.3	48.4	48.1	47.9	47.8	48.1	49.0	50.7	52.4	53.4	53.8	54.3	54.4	54.3	53.8	53.1	52.4	51.8	51.4	50.9	50.4	50.2	51.0
Harve, Mont.	40.7	40.4	39.6	39.1	38.0	37.4	37.3	37.1	37.0	39.3	43.1	45.9	48.7	51.0	52.9	54.5	54.8	54.3	51.9	48.6	45.7	43.9	42.4	40.1	44.3
Helena, Mont.	44.2	42.9	42.2	41.7	41.4	40.8	40.4	39.8	39.6	40.8	42.3	44.4	46.7	48.6	51.1	53.4	53.4	53.8	52.7	50.1	48.4	46.8	45.7	44.7	45.6
Huron, S. Dak.	42.1	41.4	40.8	40.1	39.3	38.6	38.1	38.2	40.8	44.9	49.0	52.0	54.6	56.6	58.5	59.7	59.4	57.0	53.2	50.5	47.8	45.9	44.2	42.9	47.3
Indianapolis, Ind.	52.2	51.4	50.7	49.8	49.0	48.6	48.3	49.6	52.5	56.6	60.9	64.6	67.1	68.9	70.8	72.6	73.2	71.7	68.2	65.5	62.8	60.1	57.4	54.7	58.0
Jacksonville, Fla.	67.2	66.6	66.2	65.9	65.6	65.1	65.2	67.0	70.0	72.8	74.7	76.0	76.7	76.9	76.5	75.8	74.5	72.6	71.1	70.2	69.5	68.6	67.6	67.0	70.4
Kansas City, Mo.	56.1	55.4	54.8	54.1	53.4	52.6	52.0	51.0	52.5	54.8	57.9	61.1	63.4	64.7	66.0	66.8	67.0	66.6	64.6	62.5	61.2	59.8	58.1	57.0	58.9
Key West, Fla.	77.0	76.6	76.9	76.6	76.5	76.5	76.7	77.5	78.5	79.4	80.4	80.1	80.1	80.1	80.1	79.7	79.6	78.6	78.2	77.5	77.7	77.1	77.0	77.0	78.1
Knoxville, Tenn.	55.2	54.2	52.7	51.7	50.7	49.9	49.6	51.1	54.5	58.4	61.3	63.8	66.0	67.5	68.5	69.0	68.5	67.4	64.6	62.3	60.3	58.6	57.1	55.8	59.1
Lander, Wyo.	41.2	40.3	39.1	37.7	36.4	35.5	34.6	34.4	34.9	39.9	47.7	51.6	54.8	57.0	58.6	59.5	60.1	59.2	56.1	50.5	48.0	46.0	43.6	42.1	46.2
Little Rock, Ark.	54.6	53.7	52.8	51.7	50.9	50.3	49.9	51.0	53.1	56.9	60.3	63.5	65.8	67.5	69.1	69.9	67.8	65.7	63.2	61.4	59.3	57.7	56.5	55.2	58.6
Louisville, Ky.	54.3	54.1	53.4	52.7	52.1	51.7	51.4	53.5	56.5	59.5	62.4	64.0	65.8	67.5	69.1	69.9	67.8	65.7	63.2	61.4	59.3	57.7	56.5	55.2	58.6
Lynchburg, Va.	54.3	54.1	53.4	52.7	52.1	51.7	51.4	53.5	56.5	59.5	62.4	64.0	65.8	67.5	69.1	69.9	67.8	65.7	63.2	61.4	59.3	57.7	56.5	55.2	58.6
Marquette, Mich.	45.7	45.5	45.3	44.9	44.9	44.6	44.4	44.8	45.8	47.6	49.3	50.4	51.4	51.7	51.6	51.7	50.8	49.9	48.7	47.7	47.3	46.8	46.5	45.9	47.6
Memphis, Tenn.	59.7	59.0	58.0	57.2	56.2	55.6	54.7	55.0	57.6	61.4	65.2	68.3	70.0	71.8	72.9	73.2	72.8	71.3	69.3	66.8	65.2	63.4	62.1	61.1	63.6
Milwaukee, Wis.	48.5	48.3	47.8	47.2	46.7	46.3	46.2	46.2	48.2	50.1	51.7	53.1	53.2	53.6	53.9	53.8	53.5	51.5	50.6	50.0	49.4	48.9	48.7	48.0	50.0
Montgomery, Ala.	61.1	60.3	59.2	58.4	57.7	57.0	56.5	57.6	61.1	65.9	69.2	72.2	74.4	75.8	76.6	76.5	75.9	74.5	71.4	69.5	67.1	65.3	63.4	62.1	66.2
Moorhead, Minn.	40.9	40.0	39.6	38.9	38.4	37.7	37.5	37.4	38.5	41.4	44.3	46.9	49.3	51.0	52.6	53.8	53.7	52.1	49.8	47.9	45.9	44.1	42.7	41.5	44.4
Nantucket, Mass.	53.9	53.9	53.8	53.6	53.5	53.3	54.0	55.0	55.8	56.3	57.0	57.5	57.5	57.4	57.1	56.3	55.5	55.0	54.8	54.8	54.4	53.8	54.0	54.1	55.1
Nashville, Tenn.	50.6	50.6	50.4	50.3	50.2	50.1	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
New Haven, Conn.	50.3	50.0	49.4	48.7	48.5	48.3	48.0	48.1	49.1	51.2	53.9	56.6	59.1	61.6	64.1	66.6	69.1	71.6	74.1	76.6	79.1	81.6	84.1	86.6	74.3
New Orleans, La.	66.6	65.9	65.3	64.6	64.4	63.8	63.4	64.4	67.1	70.6	73.2	75.1	76.9	77.1	77.9	78.4	77.5	76.5	73.9	72.1	70.3	68.8	67.0	65.7	70.4
New York, N. Y.	54.4	54.0	53.4	52.7	52.3	52.7	53.4	54.7	56.3	57.9	59.3	60.1	60.9	61.6	62.3	63.0	63.7	64.4	65.1	65.8	66.5	67.2	67.9	68.6	70.3

TABLE VI.—Mean pressure for each hour of seventy-fifth meridian time, October, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.....	28.218	.230	.219	.216	.217	.234	.234	.245	.260	.271	.266	.256	.236	.209	.180	.163	.150	.151	.157	.170	.181	.193	.203	.208	.210
Albany, N. Y.....	29.994	.903	.900	.904	.909	.910	.918	.922	.919	.913	.901	.883	.866	.858	.854	.851	.855	.879	.877	.884	.891	.895	.894	.895	.891
Alpena, Mich.....	29.244	.243	.241	.238	.243	.245	.250	.258	.262	.260	.251	.244	.231	.221	.215	.214	.218	.221	.231	.234	.239	.240	.237	.234	.238
Atlanta, Ga.....	28.862	.862	.861	.864	.869	.883	.892	.905	.915	.918	.915	.904	.881	.861	.848	.841	.837	.841	.849	.856	.863	.868	.867	.864	.872
Augusta, Ga.....	29.842	.842	.837	.836	.841	.849	.859	.869	.877	.878	.875	.864	.841	.820	.807	.802	.798	.806	.818	.827	.836	.845	.845	.846	.840
Baltimore, Md.....	29.806	.800	.795	.794	.801	.809	.818	.829	.835	.831	.823	.808	.791	.781	.775	.774	.783	.792	.803	.813	.817	.821	.819	.815	.805
Bismarck, N. Dak.....	28.086	.084	.086	.086	.086	.090	.092	.094	.101	.107	.105	.102	.085	.066	.050	.050	.048	.057	.062	.073	.075	.081	.082	.083	.081
Boston, Mass.....	29.859	.854	.853	.858	.860	.861	.871	.875	.873	.863	.850	.817	.812	.810	.809	.818	.818	.830	.842	.851	.855	.853	.853	.854	.846
Buffalo, N. Y.....	29.204	.199	.192	.195	.197	.201	.207	.213	.215	.214	.213	.205	.191	.184	.182	.184	.194	.199	.203	.205	.205	.200	.199	.199	.199
Charleston, S. C.....	29.987	.983	.977	.974	.978	.986	.998	.012	.020	.022	.018	.003	.992	.969	.959	.955	.957	.962	.975	.980	.990	.997	.997	.994	.987
Chicago, Ill.....	29.054	.052	.050	.049	.053	.056	.057	.064	.068	.068	.069	.065	.052	.039	.035	.032	.035	.041	.045	.047	.050	.052	.050	.046	.051
Cincinnati, Ohio.....	29.328	.327	.325	.325	.331	.337	.340	.354	.364	.361	.350	.347	.328	.311	.303	.298	.299	.305	.314	.321	.326	.329	.330	.325	.329
Cleveland, Ohio.....	29.151	.154	.154	.157	.166	.170	.179	.188	.194	.191	.186	.178	.158	.145	.139	.138	.141	.150	.155	.157	.155	.151	.147	.142	.160
Columbus, Ohio.....	29.084	.085	.082	.080	.086	.092	.100	.109	.110	.106	.102	.094	.076	.063	.050	.054	.055	.063	.070	.075	.081	.086	.082	.079	.082
Denver, Colo.....	24.751	.751	.753	.751	.747	.745	.750	.757	.762	.773	.770	.775	.767	.751	.731	.721	.715	.713	.716	.721	.729	.737	.742	.753	.746
Des Moines, Iowa.....	28.977	.980	.986	.985	.986	.991	.000	.005	.018	.021	.022	.017	.005	.988	.974	.968	.966	.967	.972	.975	.972	.970	.973	.971	.987
Detroit, Mich.....	29.162	.161	.163	.162	.166	.173	.180	.187	.191	.190	.182	.175	.162	.150	.143	.139	.140	.144	.151	.159	.157	.158	.155	.153	.163
Dodge City, Kans.....	27.362	.365	.360	.364	.365	.374	.381	.385	.396	.402	.399	.394	.380	.355	.335	.320	.319	.327	.334	.332	.340	.346	.354	.354	.360
Duluth, Minn.....	29.114	.110	.114	.111	.114	.115	.115	.119	.124	.118	.114	.113	.090	.087	.082	.086	.089	.094	.098	.099	.101	.104	.105	.103	.106
Eastport, Me.....	29.883	.881	.882	.880	.884	.894	.899	.896	.894	.888	.878	.867	.858	.852	.846	.850	.854	.859	.863	.865	.870	.870	.868	.870	.873
El Paso, Tex.....	26.230	.229	.227	.225	.223	.225	.233	.242	.256	.267	.278	.276	.266	.245	.219	.196	.182	.168	.162	.175	.188	.203	.214	.226	.223
Galveston, Tex.....	29.018	.016	.010	.008	.010	.020	.031	.039	.053	.062	.065	.068	.041	.018	.001	.991	.986	.986	.991	.997	.007	.015	.018	.019	.019
Grand Haven, Mich.....	29.224	.226	.223	.222	.227	.231	.233	.242	.245	.245	.242	.236	.227	.216	.210	.207	.205	.208	.212	.215	.213	.213	.212	.212	.223
Harre, Mont.....	27.259	.258	.265	.264	.262	.260	.263	.261	.258	.259	.268	.273	.272	.263	.249	.242	.236	.233	.234	.241	.247	.254	.258	.258	.250
Helena, Mont.....	25.804	.806	.812	.812	.812	.810	.813	.818	.822	.827	.834	.835	.825	.812	.795	.776	.767	.761	.760	.766	.774	.784	.799	.804	.801
Huron, S. Dak.....	28.481	.482	.483	.478	.478	.480	.485	.485	.489	.488	.482	.478	.460	.455	.444	.440	.440	.439	.450	.461	.462	.472	.476	.474	.470
Indianapolis, Ind.....	30.166	.167	.168	.165	.171	.176	.183	.192	.196	.197	.191	.181	.165	.148	.140	.138	.140	.144	.149	.156	.161	.163	.163	.160	.166
Jacksonville, Fla.....	29.947	.942	.932	.932	.939	.949	.962	.973	.979	.979	.975	.960	.937	.922	.918	.912	.922	.933	.945	.955	.963	.963	.959	.952	.948
Kansas City, Mo.....	28.054	.052	.053	.049	.056	.064	.071	.073	.080	.084	.088	.093	.088	.077	.063	.050	.049	.050	.057	.063	.069	.074	.081	.085	.086
Key West, Fla.....	29.935	.920	.918	.916	.920	.930	.945	.959	.970	.973	.969	.957	.939	.918	.907	.904	.906	.914	.925	.938	.951	.956	.954	.946	.936
Knoxville, Tenn.....	29.007	.007	.009	.013	.018	.025	.032	.043	.048	.049	.044	.032	.008	.993	.974	.966	.964	.970	.982	.990	.998	.007	.008	.005	.008
Little Rock, Ark.....	29.711	.715	.715	.721	.729	.737	.745	.761	.773	.766	.756	.734	.704	.688	.676	.669	.668	.674	.682	.692	.697	.705	.706	.714	.714
Louisville, Ky.....	29.441	.442	.442	.440	.445	.453	.463	.476	.483	.478	.468	.447	.427	.415	.410	.411	.413	.421	.427	.432	.437	.443	.448	.443	.443
Lynchburg, Va.....	29.296	.293	.293	.297	.307	.315	.326	.336	.338	.338	.338	.338	.317	.299	.274	.264	.260	.269	.279	.287	.295	.300	.299	.297	.298
Marquette, Mich.....	29.059	.057	.057	.054	.057	.056	.060	.060	.062	.064	.061	.060	.050	.042	.030	.037	.041	.048	.056	.059	.058	.057	.055	.048	.054
Memphis, Tenn.....	29.697	.699	.699	.701	.707	.718	.729	.740	.752	.758	.755	.746	.723	.698	.681	.673	.668	.668	.673	.678	.685	.689	.691	.690	.705
Milwaukee, Wis.....	29.175	.180	.179	.181	.185	.189	.192	.197	.199	.195	.191	.189	.174	.159	.150	.143	.139	.144	.149	.156	.161	.163	.163	.158	.174
Moorhead, Minn.....	28.833	.832	.829	.825	.825	.820	.820	.823	.820	.822	.821	.825	.817	.808	.801	.799	.801	.807	.812	.813	.809	.811	.815	.818	.817
Nantucket, Mass.....	30.001	.996	.990	.991	.994	.995	.000	.006	.005	.000	.994	.980	.966	.957	.953	.952	.958	.969	.979	.985	.993	.998	.000	.999	.986
Nashville, Tenn.....	29.449	.450	.446	.446	.454	.461	.470	.480	.488	.486	.484	.472	.442	.427	.419	.414	.415	.422	.432	.438	.446	.459	.452	.446	.449
New Haven, Conn.....	29.871	.864	.858	.862	.865	.867	.875	.877	.875	.867	.855	.837	.818	.815	.814	.818	.828	.842	.853	.864	.872	.874	.871	.871	.855
New Orleans, La.....	29.967	.964	.959	.957	.961	.970	.979	.987	.992	.988	.985	.975	.957	.942	.934	.933	.940	.949	.961	.970	.977	.977	.973	.968	.968
New York, N. Y.....	29.805	.800	.795	.792	.795	.798	.802	.807	.804	.799	.791	.782	.770	.765	.763	.767	.770	.785	.795	.804	.809	.811	.811	.809	.793
Norfolk, Va.....	29.925	.921	.921	.928	.939	.948	.962	.975	.981	.978	.973	.961	.936	.925	.917	.914	.914	.922	.927	.934	.937	.938	.938	.933	.939
Omaha, Neb.....	28.739	.741	.745	.744	.750	.754	.758	.765	.774	.778	.774	.769	.750	.731	.717	.712	.703	.710	.715	.722	.722	.726	.730	.730	.740
Parkersburg, W. Va.....	29.335	.336	.335	.338	.343	.347	.352	.366	.368	.366	.361	.352	.332	.316	.307	.305	.304	.312	.319	.322	.330	.334	.334	.333	.335
Philadelphia, Pa.....	29.885	.878	.868	.869	.872	.871	.881	.893	.895	.892	.890	.877	.859	.850	.848	.851	.856	.866	.876	.886	.891	.896	.895	.891	.877
Pittsburg, Pa.....	29.126	.123	.122	.125	.129	.133	.140	.146	.148	.142	.135	.124	.106	.086	.081	.077	.086	.096	.106	.112	.116	.122	.120	.119	.118
Portland, Ore.....	29.857	.856	.859	.862	.865	.857	.855	.854	.859	.865	.870	.871	.868	.851	.842	.838	.834	.832	.829	.836	.844	.852	.861	.863	.853
Rochester, N. Y.....	29.390	.386	.385	.385	.387	.393	.399	.402	.402	.396	.391	.382	.369	.365	.362	.368	.374	.381	.388	.397	.394	.388	.385	.384	.385
Roseburg, Ore.....	29.442	.443	.445	.446	.447	.445	.444	.448	.441	.441	.440	.448	.442	.442	.435	.422	.414	.409	.409	.410	.424	.425	.432	.441	.435
St. Louis, Mo.....	29.399	.392	.390	.391	.393	.398	.403	.411	.418	.423	.423	.419	.402	.380	.360	.358	.357	.359	.365	.375	.378	.383	.384	.382	.389
St. Paul, Minn.....	28.949	.952	.947	.945	.945	.950	.954	.960	.969	.975	.974	.970	.959	.940	.925	.919	.916	.919	.923	.933	.940	.943	.940	.940	.940
Salt Lake City, Utah.....	25.692	.693	.697	.698	.698	.698	.707	.714	.725	.735	.740	.741	.735	.723	.702	.690	.678	.674	.668	.666	.674	.677	.685	.691	.700
San Diego, Cal.....	29.868	.879	.876	.873	.867	.864	.864	.868	.875	.885	.894	.898	.												



TABLE VII.—Average wind movement for each hour of seventy-fifth meridian time, October, 1894.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.....	8.5	8.2	7.7	7.5	7.5	7.2	7.0	7.0	8.3	10.1	12.2	13.9	14.1	13.4	13.6	12.7	12.8	12.1	10.5	7.8	7.9	8.0	9.0	8.7	9.8
Albany, N. Y.....	5.6	4.6	5.2	4.7	4.6	4.9	5.5	6.0	7.9	8.9	9.9	10.9	11.1	10.8	10.9	10.0	8.7	6.9	6.4	6.2	5.7	5.3	5.4	5.6	7.2
Alpena, Mich.....	7.4	7.3	7.0	7.2	7.1	7.1	7.0	7.7	8.1	9.9	10.8	11.2	11.5	12.4	12.9	12.8	12.5	11.5	9.7	9.1	9.0	16.9	16.8	17.0	9.3
Amarillo, Tex.....	17.0	17.3	16.4	16.2	15.1	15.7	16.3	15.9	15.3	16.9	20.6	21.3	21.8	21.9	21.6	21.2	21.3	20.5	19.0	15.6	15.2	16.0	16.8	17.0	18.0
Atlanta, Ga.....	9.4	9.6	9.8	9.6	9.4	9.2	8.9	9.2	8.8	10.0	10.0	10.3	10.3	10.3	9.9	10.1	9.7	8.4	7.4	8.6	9.3	9.4	9.0	9.6	9.4
Atlantic City, N. J.....	12.1	12.1	11.7	11.0	11.3	12.0	11.9	13.0	13.5	14.9	16.0	16.2	16.0	15.6	15.7	14.9	13.4	11.5	11.0	11.8	12.1	11.5	12.1	11.6	13.0
Augusta, Ga.....	3.2	3.4	3.0	4.2	4.3	4.0	3.9	3.4	4.0	4.8	5.1	5.5	6.2	5.9	6.1	5.9	5.5	4.7	3.6	2.8	2.5	2.5	3.0	3.7	4.0
Baker City, Oreg.....	5.2	4.9	4.6	5.0	5.4	5.4	5.1	5.7	5.3	5.3	5.4	4.6	4.5	4.6	4.7	4.9	5.3	5.6	5.5	6.1	4.6	4.5	3.6	4.5	5.0
Baltimore, Md.....	5.8	5.6	5.3	5.8	6.2	6.2	6.2	6.9	7.9	10.0	11.0	11.5	11.4	10.9	10.9	10.4	9.6	7.6	6.4	6.3	6.4	6.1	6.8	6.2	7.8
Bismarck, N. Dak.....	8.5	8.4	8.6	8.6	9.0	9.7	9.1	9.6	8.4	9.2	11.4	13.3	14.1	15.5	16.0	16.1	16.0	14.6	11.4	9.4	8.8	8.5	7.9	8.1	10.8
Block Island, R. I.....	19.7	20.2	21.1	21.5	20.5	20.1	19.9	20.1	21.3	19.5	19.6	20.6	21.7	21.7	21.3	21.3	20.7	19.9	20.3	20.8	20.5	20.1	19.5	19.1	20.4
Boston, Mass.....	9.6	9.6	9.8	10.3	10.3	10.1	10.0	11.3	12.8	14.1	14.5	15.1	15.0	14.7	14.7	13.8	13.6	12.7	11.6	11.4	12.1	11.2	11.1	10.4	11.9
Buffalo, N. Y.....	9.0	8.7	9.5	10.0	9.8	9.9	10.2	10.4	10.6	11.0	12.1	12.5	13.4	13.5	13.7	13.4	13.2	12.4	12.0	11.4	11.0	11.4	11.5	10.5	11.3
Cairo, Ill.....	8.4	6.6	6.7	6.5	6.6	6.5	6.1	6.6	7.0	8.4	9.3	10.0	10.4	11.0	11.3	10.5	10.3	8.4	6.6	6.1	6.0	6.1	6.3	6.5	7.8
Cape Henry, Va.....	13.4	14.4	14.8	14.7	14.0	13.6	14.5	15.3	14.7	15.1	14.9	15.0	14.7	13.6	13.1	13.5	12.0	11.5	12.0	13.3	12.5	12.0	12.7	13.0	13.7
Charleston, S. C.....	6.8	7.1	7.0	7.3	7.6	7.9	8.3	8.9	9.6	10.2	10.8	10.4	11.5	11.6	11.7	11.1	10.1	8.2	7.3	7.2	7.3	6.7	7.2	6.8	8.7
Charlotte, N. C.....	5.6	5.9	5.6	5.1	5.5	5.6	5.5	5.5	6.5	7.3	7.6	8.1	8.2	8.3	8.1	8.2	7.0	5.4	5.0	5.0	4.0	4.0	5.5	5.4	6.2
Chattanooga, Tenn.....	4.2	4.2	4.4	3.9	4.4	4.3	4.7	4.8	5.0	5.9	7.1	8.0	8.5	9.1	9.2	9.5	9.7	8.4	6.2	5.6	5.1	4.9	5.0	4.1	6.1
Cheyenne, Wyo.....	9.3	9.9	9.3	9.9	9.9	10.7	10.8	11.1	11.6	11.8	14.7	17.0	18.8	19.3	19.8	19.8	18.6	15.4	11.2	10.2	9.4	9.1	9.2	13.2	13.2
Chicago, Ill.....	15.5	15.7	16.1	16.4	16.6	15.9	16.5	17.0	16.6	17.4	17.4	17.4	18.4	17.9	17.0	17.4	17.3	14.6	14.6	15.6	16.1	16.5	16.5	15.4	16.5
Cincinnati, Ohio.....	4.8	4.7	4.8	5.1	5.3	5.3	5.1	5.9	7.1	7.8	8.9	9.3	10.2	10.1	10.9	10.5	10.7	9.1	8.2	6.9	6.6	6.5	5.6	5.1	7.3
Cleveland, Ohio.....	13.5	13.5	13.0	12.6	12.3	11.6	11.7	11.8	12.6	13.4	14.1	14.6	14.7	14.7	15.3	14.3	12.5	11.1	10.0	11.7	11.7	13.4	14.3	13.4	13.0
Columbia, Mo.....	6.5	6.1	6.0	5.8	5.9	5.9	5.9	5.9	6.6	8.2	9.9	9.6	9.2	9.9	9.8	10.0	9.7	8.2	6.5	6.1	6.5	6.6	6.5	6.5	7.4
Columbus, Ohio.....	6.5	6.2	6.1	6.3	6.4	6.6	6.1	6.2	6.9	7.9	9.0	9.1	9.7	10.7	10.0	9.8	9.5	8.0	7.4	7.6	8.0	6.9	6.8	7.0	7.7
Concordia, Kans.....	7.4	6.6	5.5	5.8	6.1	6.1	6.4	6.8	6.9	9.0	10.8	11.6	11.9	12.8	13.6	13.2	12.6	11.8	8.9	7.1	6.6	7.0	7.7	7.6	8.7
Corpus Christi, Tex.....	11.3	10.1	9.3	8.6	8.1	8.0	8.1	8.7	8.7	10.2	11.0	11.1	11.8	13.7	14.5	14.5	14.8	14.6	14.9	13.3	13.2	13.1	11.3	10.8	11.4
Davenport, Iowa.....	8.1	8.2	8.3	8.4	8.6	8.0	7.9	8.6	9.3	10.2	11.4	12.8	13.1	13.2	13.3	13.0	12.7	11.3	9.2	8.7	7.7	8.5	8.1	9.9	9.9
Denver, Colo.....	7.8	7.1	7.8	7.3	6.4	6.8	6.3	6.5	6.8	6.5	6.6	6.7	8.6	10.3	10.8	10.4	9.9	10.3	8.8	7.9	7.3	6.5	7.1	6.8	7.8
Des Moines, Iowa.....	6.6	6.9	6.8	6.5	6.3	5.9	6.0	6.0	6.4	7.6	9.2	9.9	10.7	11.1	11.5	11.4	11.1	9.5	7.3	6.8	6.5	6.6	7.0	7.1	7.9
Detroit, Mich.....	9.3	9.4	9.3	8.4	8.5	8.8	8.6	8.5	9.3	10.1	11.1	11.4	11.9	13.2	13.6	12.5	11.5	10.0	9.3	9.6	10.3	10.1	10.5	10.6	10.2
Dodge City, Kans.....	9.6	9.1	9.6	9.8	10.1	10.1	10.1	9.7	10.6	12.8	15.3	16.6	17.6	17.2	17.1	17.6	16.5	15.3	12.5	9.3	9.4	9.8	9.8	9.3	12.3
Duluth, Minn.....	7.0	6.3	6.6	6.3	5.7	6.0	6.1	6.9	7.0	8.1	7.7	7.7	8.4	9.2	9.0	8.5	8.3	8.1	7.1	7.4	6.6	7.0	6.8	7.3	7.3
Eastport, Me.....	9.5	9.7	9.5	10.1	10.5	10.3	10.0	10.6	11.2	11.8	11.7	12.1	12.0	12.3	12.1	11.7	11.3	10.7	10.6	10.6	10.2	11.3	11.1	10.7	10.9
El Paso, Tex.....	10.1	9.8	9.1	9.6	10.3	9.2	8.7	8.8	8.0	8.2	9.4	10.3	10.2	10.0	11.1	11.4	11.6	12.2	11.2	10.0	9.0	8.9	8.6	9.4	9.8
Erie, Pa.....	12.8	12.2	11.8	11.7	11.6	11.8	12.3	12.3	12.2	12.3	11.9	11.5	11.5	11.7	11.6	11.7	10.4	9.8	10.8	10.2	10.2	11.4	11.7	11.9	11.6
Eureka, Cal.....	3.6	3.4	4.0	3.4	4.0	3.5	4.5	4.3	4.2	4.3	4.9	4.7	5.0	5.4	6.4	7.6	8.3	7.8	7.2	6.4	4.9	3.9	3.6	4.0	5.0
Fort Canby, Wash.....	15.6	15.1	15.5	15.5	16.1	16.1	16.1	15.1	16.6	15.5	15.4	15.5	14.2	14.2	15.9	17.3	18.7	19.1	17.4	16.0	16.4	16.2	14.5	15.9	15.9
Fort Smith, Ark.....	5.3	6.0	5.8	6.1	5.8	5.5	5.4	6.2	6.3	6.7	7.1	7.5	8.1	8.5	9.4	9.5	8.8	8.2	6.4	6.2	5.4	5.6	6.2	5.7	6.7
Fresno, Cal.....	5.2	4.9	4.3	4.4	4.5	4.1	4.3	4.3	4.2	3.8	3.9	4.0	4.5	4.7	4.9	5.2	5.4	6.2	6.1	5.6	4.6	4.8	5.9	5.9	4.8
Galveston, Tex.....	10.4	10.4	10.2	9.5	9.9	9.8	9.6	9.6	9.8	10.2	10.9	11.2	11.5	12.0	11.9	11.7	11.9	11.1	9.9	9.5	10.2	10.4	10.4	10.2	10.5
Grand Haven, Mich.....	9.6	9.3	9.4	8.9	8.7	8.8	9.4	9.9	10.1	10.6	11.8	12.6	13.7	13.4	12.5	12.5	12.3	10.9	10.1	10.0	10.2	9.8	9.6	10.2	10.5
Green Bay, Wis.....	6.7	6.9	7.0	7.1	7.0	7.3	6.9	6.9	8.0	8.8	9.9	11.1	12.7	10.8	10.7	10.9	10.1	8.4	7.8	7.9	8.0	7.1	7.4	7.2	8.4
Hannibal, Mo.....	9.5	8.9	9.1	9.0	9.0	8.7	8.6	8.0	9.3	11.2	12.3	12.6	13.5	14.0	13.8	13.7	12.8	11.0	8.3	7.6	7.9	8.8	8.6	9.4	10.2
Harrisburg, Pa.....	5.6	5.5	5.6	6.0	5.7	5.7	6.1	6.8	7.6	8.0	8.6	9.3	9.8	9.7	9.4	9.5	8.3	8.1	7.3	6.8	6.2	6.2	5.7	5.4	7.2
Hatteras, N. C.....	13.3	13.5	13.9	14.0	14.1	14.3	14.2	13.9	14.8	14.5	14.5	14.3	14.7	14.1	13.9	14.0	13.5	12.4	12.6	12.4	12.3	12.4	12.8	12.1	13.6
Havre, Mont.....	7.7	9.0	8.4	8.4	7.7	7.6	7.9	8.5	8.9	9.6	10.5	12.0	13.4	14.4	14.2	13.8	13.1	11.2	9.8	7.1	6.2	6.4	7.4	6.7	9.6
Helena, Mont.....	8.1	8.3	8.4	7.7	6.9	7.5	7.7	7.2	7.3	7.8	7.7	8.1	9.2	9.0	9.1	9.3	9.6	9.3	9.2	9.2	10.1	11.3	10.1	9.2	8.6
Huron, S. Dak.....	14.2	14.5	14.4	14.5	15.0	14.7	14.5	14.3	14.9	15.9	18.5	19.4	19.9	21.2	21.3	20.6	19.2	17.2	14.6	14.3	14.7	13.9	14.1	13.8	16.2
Idaho Falls, Idaho.....	8.3	8.5	8.6	8.3	8.4	8.1	7.6	7.6	7.5	7.5	6.9	7.7	8.9	9.0	9.7	9.8	10.4	10.9	10.4	9.2	9.2	9.4	9.3	9.1	8.8
Indianapolis, Ind.....	5.2	4.6	4.5	4.8	4.6	4.7	4.8	4.8	5.8	6.8	7.9	8.5	9.4	9.4	9.3	9.2	8.1	7.1	5.6	5.5	5.5	5.6	5.5	6.4	6.4
Jacksonville, Fla.....	6.5	6.1	6.5	6.7	7.0	7.0	7.1	6.8	7.8	9.1	10.1	10.7	10.8	11.1	11.6	11.4	11.1	9.2	7.3	6.5	6.0	5.7	5.9	6.2	8.1
Jupiter, Fla.....	9.9	9.5	10.1	9.8	10.3	10.4	10.1	10.1	10.7	12.4	13.4	13.6	13.8	13.4	12.6	11.6	11.0	10.8	10.7	10.2	10.2	10.2	10.2	10.5	11.4
Kansas City, Mo.....	8.1	8.1	8.2	7.7	8.0	7.4	7.3	7.2	7.5	8.2	8.9	9.7	10.3	10.0	10.1	10.0	9.8	7.3	7.3	8.0	8.0				

TABLE VII.—Average wind movement, etc.—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Parkersburg, W. Va. . . . .	3.7	3.5	3.7	3.3	3.0	3.4	3.6	3.9	4.3	5.3	6.2	6.9	7.4	8.2	7.6	7.5	7.3	5.9	4.5	4.4	4.9	4.6	4.3	4.0	5.1
Pennacola, Fla. . . . .	10.2	10.3	10.1	10.2	10.3	9.9	9.5	9.0	9.5	10.3	10.8	11.2	11.1	11.6	12.0	12.4	12.5	10.1	8.0	8.4	8.8	8.6	9.3	9.3	10.2
Philadelphia, Pa. . . . .	9.1	8.5	8.8	9.3	9.0	9.0	9.1	10.1	11.3	12.6	13.0	12.7	13.6	13.6	13.2	12.3	11.4	9.7	10.0	9.9	9.9	9.1	8.8	8.9	10.6
Pierre, S. Dak. . . . .	8.0	8.0	7.8	8.3	9.1	10.1	9.7	9.5	9.1	11.0	12.4	12.6	13.4	14.7	15.3	15.1	14.4	13.8	11.5	10.2	9.5	9.1	9.1	8.1	10.8
Pittsburg, Pa. . . . .	4.2	4.7	4.9	4.9	4.8	4.6	4.6	4.9	5.5	6.7	7.1	7.4	8.4	8.3	8.5	8.2	7.8	6.5	5.3	5.4	5.5	5.2	4.9	4.6	6.0
Port Angeles, Wash. . . . .	4.1	4.4	4.6	4.9	5.1	5.2	5.0	4.5	4.5	4.3	4.4	3.8	3.9	4.5	5.5	6.0	5.9	5.7	5.0	4.4	4.2	4.9	4.5	4.0	4.7
Port Huron, Mich. . . . .	9.5	9.5	9.2	9.2	8.8	9.3	10.0	9.8	10.3	11.3	11.6	11.7	12.4	13.0	14.0	13.8	12.2	10.3	9.4	10.0	10.2	9.9	9.5	9.5	10.6
Portland, Me. . . . .	6.1	6.7	6.2	6.0	5.9	5.4	5.6	6.2	7.4	8.8	8.0	8.3	9.2	11.4	11.1	10.0	8.5	7.7	6.7	6.0	6.4	6.0	6.0	7.1	7.6
Portland, Oreg. . . . .	9.2	8.9	9.1	8.0	8.1	8.9	9.0	8.8	8.6	8.2	7.8	8.3	9.2	10.2	10.5	10.8	9.9	9.6	10.3	10.3	10.8	10.7	9.8	9.4	9.4
Pueblo, Colo. . . . .	5.9	6.6	5.6	5.6	5.8	5.4	5.3	5.1	5.1	5.2	6.3	7.9	9.2	9.8	11.0	12.0	12.5	12.1	11.4	8.8	7.0	5.4	5.3	5.2	7.5
Raleigh, N. C. . . . .	5.2	5.1	5.4	5.4	5.3	5.3	5.4	5.3	6.2	7.5	7.7	7.7	8.1	7.8	8.1	7.6	6.3	5.1	5.0	5.4	5.4	5.8	5.5	5.2	6.1
Rapid City, S. Dak. . . . .	8.9	9.9	10.1	10.0	9.4	9.5	9.4	10.7	11.7	11.3	11.5	12.8	14.2	15.1	15.1	15.4	15.0	14.3	11.3	8.5	8.0	8.7	9.2	8.8	11.2
Red Bluff, Cal. . . . .	6.2	6.3	6.2	6.2	6.0	6.3	5.8	6.7	6.1	5.9	6.1	6.7	7.3	8.0	8.1	8.0	8.0	7.3	7.3	7.1	5.4	6.3	5.6	5.5	6.6
Rochester, N. Y. . . . .	5.9	5.9	5.7	6.2	6.0	6.4	6.3	6.5	7.4	8.5	9.2	9.7	10.9	10.2	10.2	9.2	8.5	7.1	6.6	6.6	6.5	6.8	6.6	6.4	7.5
Roseburg, Oreg. . . . .	1.4	1.6	1.3	1.2	0.9	0.9	1.0	1.0	1.2	1.5	1.9	1.6	2.3	3.1	3.8	5.2	5.5	5.7	5.2	5.3	3.5	2.2	1.5	1.4	2.5
Sacramento, Cal. . . . .	7.9	7.0	6.5	7.6	8.3	7.6	7.0	7.4	7.3	6.9	6.6	6.9	7.7	7.8	8.5	8.7	8.3	7.7	6.8	6.4	7.1	7.2	7.2	7.6	7.4
St. Louis, Mo. . . . .	11.0	10.3	10.3	10.1	10.5	10.1	11.6	11.5	11.8	12.0	13.5	13.1	14.3	13.7	13.7	14.1	13.8	11.9	10.8	10.4	10.6	11.0	11.0	10.9	11.8
St. Paul, Minn. . . . .	7.8	7.4	7.6	7.4	7.4	7.6	8.2	7.4	7.6	9.0	9.4	10.2	10.6	10.2	10.3	10.8	9.9	9.2	8.2	7.8	7.9	7.3	7.5	7.5	8.5
St. Vincent, Minn. . . . .	9.0	9.3	9.4	8.8	8.6	8.4	8.6	8.5	8.6	10.3	11.3	12.2	13.2	14.4	14.8	14.5	13.4	11.5	9.7	8.8	9.0	9.0	8.8	9.2	10.4
Salt Lake City, Utah. . . . .	4.7	5.5	5.5	4.8	4.7	4.7	4.5	5.7	5.5	4.4	4.5	5.2	6.0	7.3	8.4	9.3	9.6	9.3	7.7	4.9	5.1	4.4	4.5	4.8	5.9
San Antonio, Tex. . . . .	5.5	4.8	4.4	4.7	4.7	4.5	4.2	4.2	4.0	4.2	5.8	6.9	7.4	7.4	7.4	7.6	6.3	5.7	6.8	6.1	5.9	6.5	6.7	6.3	5.9
San Diego, Cal. . . . .	2.3	2.2	2.3	2.1	2.1	2.3	2.6	2.9	2.6	2.3	3.2	3.8	4.7	7.3	8.7	9.1	8.9	8.9	7.6	6.4	4.7	3.3	2.8	2.6	4.3
Sandusky, Ohio . . . . .	6.0	5.7	5.7	6.0	5.7	5.8	6.5	6.4	6.5	6.0	6.0	6.7	7.6	7.5	7.4	7.3	6.6	5.7	6.2	6.7	7.0	6.7	6.7	5.8	6.5
San Francisco, Cal. . . . .	8.3	7.7	7.5	6.8	6.3	6.0	6.2	6.2	5.7	6.0	6.0	6.2	6.6	7.8	9.1	11.4	12.8	14.0	14.4	14.7	14.8	12.5	10.2	9.1	9.0
San Luis Obispo, Cal. . . . .	4.6	5.3	5.1	5.7	5.4	5.7	5.8	5.8	5.6	5.8	5.9	6.7	7.3	7.1	8.2	9.3	9.8	9.5	9.1	8.9	7.6	5.6	4.7	4.1	6.6
Santa Fe, N. Mex. . . . .	6.1	5.2	4.6	4.7	4.7	5.0	4.6	4.5	4.4	4.5	6.2	7.8	9.2	9.9	10.0	10.7	10.5	9.0	7.9	5.4	4.7	5.1	5.3	5.3	6.5
Sault Ste. Marie, Mich. . . . .	7.9	7.8	7.7	7.9	7.5	7.5	7.9	8.2	8.9	10.5	10.6	10.6	11.3	11.2	11.7	11.6	10.7	10.3	9.1	8.2	7.1	7.2	7.3	7.4	9.0
Savannah, Ga. . . . .	6.8	6.7	7.4	7.1	7.4	7.5	8.0	8.1	9.3	10.2	11.7	11.5	11.4	11.4	10.6	10.9	10.5	8.8	7.6	6.9	7.1	7.2	7.3	7.1	8.7
Seattle, Wash. . . . .	5.5	6.0	5.8	6.1	5.8	6.2	5.7	5.8	5.8	5.6	5.8	5.6	6.0	6.5	7.2	7.1	7.4	7.3	6.7	6.5	6.8	6.0	6.2	5.6	6.2
Shreveport, La. . . . .	5.0	4.6	4.9	4.7	4.5	4.6	4.3	4.3	4.7	5.9	6.5	7.7	7.7	7.8	7.6	8.0	7.1	6.0	5.0	5.3	5.5	5.9	5.6	5.8	5.8
Sioux City, Iowa . . . . .	10.2	10.2	9.9	10.1	10.9	10.3	10.3	10.4	12.1	13.5	14.9	16.1	16.7	16.5	17.4	17.4	16.8	14.8	12.9	11.4	11.6	11.7	11.0	11.2	12.8
Spokane, Wash. . . . .	5.8	6.3	6.1	6.3	6.2	5.9	5.5	5.0	5.2	5.3	5.7	5.9	6.4	7.3	8.3	8.6	9.0	8.7	8.1	7.4	6.3	6.3	6.6	6.4	6.6
Springfield, Ill. . . . .	9.0	9.4	9.0	8.7	9.0	9.1	9.1	9.2	9.6	12.1	12.9	12.8	13.3	13.8	13.7	13.6	12.9	10.4	8.5	8.7	8.8	9.4	10.1	9.5	10.5
Springfield, Mo. . . . .	10.3	10.1	10.0	9.8	9.7	9.6	10.2	10.3	10.6	12.0	12.9	13.2	14.1	14.0	13.6	12.9	13.1	11.8	9.7	10.7	10.5	10.2	10.2	11.3	7.1
Tampa, Fla. . . . .	5.9	5.9	5.5	5.5	5.9	5.9	6.0	6.3	7.2	8.3	8.5	8.7	8.9	9.1	9.0	8.9	9.0	7.4	7.0	6.5	6.5	6.1	6.4	6.2	7.1
Tatoosh Island, Wash. . . . .	12.0	13.0	13.5	14.2	14.6	15.0	14.8	14.4	14.7	15.7	15.8	16.4	16.6	15.2	15.8	15.1	14.3	13.0	12.3	12.5	12.0	13.1	12.6	13.8	14.1
Titusville, Fla. . . . .	11.3	11.3	11.4	11.6	11.5	10.5	11.4	11.9	14.2	16.1	16.6	15.9	18.1	17.8	18.3	18.5	17.4	14.6	13.8	13.2	12.8	12.0	11.6	10.8	13.8
Toledo, Ohio . . . . .	8.8	8.0	7.8	7.7	7.7	8.4	7.7	7.6	8.4	9.9	11.1	12.0	11.7	11.9	12.0	12.2	11.3	10.0	8.9	9.1	10.0	9.8	9.1	9.4	9.6
Tucson, Ariz. . . . .	4.0	3.8	3.5	3.4	3.8	3.8	3.6	3.6	3.9	4.0	3.2	3.3	3.9	4.2	5.0	5.2	6.2	6.4	6.1	4.8	4.1	4.1	4.1	4.0	4.3
Valentine, Nebr. . . . .	11.4	11.6	10.9	11.2	10.4	11.8	11.9	11.3	11.8	11.8	13.8	15.0	17.2	16.9	16.6	16.5	17.2	16.6	15.0	11.7	10.2	10.1	10.3	11.1	13.0
Vicksburg, Miss. . . . .	5.4	5.4	5.4	5.5	5.7	5.7	5.6	5.8	6.3	6.1	6.4	6.6	6.8	7.4	7.6	7.4	7.0	5.7	4.0	4.8	5.4	5.2	5.4	5.6	5.9
Vineyard Haven, Mass. . . . .	10.5	10.6	10.5	11.0	11.7	11.6	11.3	12.8	13.2	14.1	14.5	13.8	13.9	14.3	14.0	13.4	12.6	12.2	11.6	11.8	11.4	11.1	11.4	10.8	12.2
Walla Walla, Wash. . . . .	5.8	5.2	5.1	5.2	4.9	4.8	5.0	4.8	4.6	4.5	4.9	5.7	6.5	7.1	7.5	7.9	8.2	6.5	5.3	5.7	5.5	6.0	5.6	5.5	5.8
Washington, D. C. . . . .	3.9	4.2	4.3	4.7	5.1	5.1	5.2	5.6	7.9	9.1	9.5	9.6	10.0	10.0	9.6	9.0	8.2	6.5	5.3	5.2	5.4	5.1	5.2	5.0	6.6
Wichita, Kans. . . . .	7.7	7.2	7.5	6.9	6.2	5.9	6.4	6.9	7.3	9.2	10.6	11.3	12.1	12.8	13.1	12.6	11.5	10.6	8.4	7.4	7.4	7.3	7.7	7.6	8.8
Williston, N. Dak. . . . .	7.1	8.0	7.5	7.8	8.1	6.9	6.5	7.5	7.5	7.3	8.6	9.7	11.8	13.6	16.3	16.3	17.0	14.4	11.0	9.0	8.5	8.2	8.0	7.5	9.8
Wilmington, N. C. . . . .	7.6	7.4	7.2	7.1	6.7	6.3	6.4	7.1	9.1	9.9	10.1	10.7	11.0	10.8	11.3	11.0	10.3	7.8	7.5	7.5	7.7	7.7	7.7	7.4	8.5
Winemucca, Nev. . . . .	9.0	8.5	8.5	8.6	9.3	8.5	7.3	8.1	8.2	8.6	8.2	9.2	9.2	10.3	11.1	12.3	13.2	12.1	11.2	9.8	8.2	7.6	7.9	8.3	9.3
Woods Holl, Mass. . . . .	15.5	15.1	15.3	15.9	16.0	15.9	15.3	15.6	16.4	17.2	18.2	17.9	18.3	19.5	19.2	19.0	18.3	17.8	17.9	17.9	17.7	17.9	18.1	16.6	17.2
Yuma, Ariz. . . . .	4.1	4.1	4.2	4.0	3.7	3.5	3.3	3.5	3.0	3.3	4.2	5.1	6.1	6.4	6.7	6.6	6.5	6.7	6.4	6.1	6.2	5.1	4.4	4.1	4.9

\*Sums and means for 27 days.



TABLE VIII.—Prevailing and resultant winds from self-registers for October, 1894.

Number.	Station.	Prevailing wind.		Total movement.		Resultant direction.			Resultant movement.		Azimuth of movement minus direction.	Ratio of resultant movement to total movement.
		Direction from.	Duration.	Monthly.	Hourly average.	Direction from.	Duration.	Average hourly velocity.	Direction from.	Amount.		
	(1)	(2)	(3) Hours.	(4) Miles.	(5) Miles.	(6)	(7) Hours.	(8) Miles.	(9)	(10) Miles.	(11)	(12)
1	Eastport, Me.	sw.	155	8,110	10.9	s. 80 w.	126	7.5	s. 23 w.	941	— 57	0.116
2	Portland, Me.	w.	132	8,654	7.6	s. 52 w.	118	7.3	s. 26 w.	864	— 26	0.153
3	Boston, Mass.	w.	199	8,881	11.9	n. 74 w.	110	14.6	n. 79 w.	1,611	— 5	0.181
4	Nantucket, Mass.	se.	137	10,278	13.8	n. 46 w.	54	21.7	n. 60 e.	1,171	+ 106	0.114
5	New Haven, Conn.	ne.	166	7,724	10.4	n. 51 w.	176	9.5	n. 35 w.	1,672	+ 16	0.216
10	Albany, N. Y.	s.	227	5,325	7.2	s. 35 w.	179	10.1	s. 26 w.	1,809	— 9	0.340
11	New York, N. Y.	ne.	144	8,638	11.6	n. 61 w.	115	18.2	n. 49 w.	2,096	+ 12	0.243
12	Philadelphia, Pa.	ne.	131	7,862	10.6	n. 54 w.	111	16.1	n. 36 w.	1,784	+ 18	0.227
13	Baltimore, Md.	nw.	121	5,868	7.8	n. 53 w.	76	18.8	n. 73 w.	1,425	— 20	0.245
14	Washington, D. C.	nw.	164	4,929	6.6	n. 42 w.	142	9.2	n. 50 w.	1,314	— 8	0.267
17	Lynchburg, Va.	sw.	118	3,011	4.0	s. 88 w.	86	7.7	n. 81 w.	660	+ 11	0.219
18	Norfolk, Va.	ne.	167	6,835	9.2	n. 2 w.	113	8.9	n. 31 w.	1,008	— 29	0.147
24	Wilmington, N. C.	ne.	223	6,306	8.5	n. 4 e.	176	7.9	n. 3 e.	1,388	— 1	0.220
26	Augusta, Ga.	nw.	138	3,154	4.2	n. 6 e.	93	9.6	n. 13 w.	592	+ 19	0.283
27	Savannah, Ga.	ne.	183	6,456	8.7	n. 12 e.	185	8.9	n. 17 e.	1,642	+ 5	0.255
28	Jacksonville, Fla.	ne.	195	6,024	8.1	n. 17 e.	223	6.5	n. 29 e.	1,440	+ 12	0.239
30	Key West, Fla.	ne.	180	9,316	12.5	n. 66 e.	296	14.5	n. 57 e.	4,326	— 9	0.404
33	Atlanta, Ga.	nw.	165	7,013	9.4	n. 10 w.	130	9.4	n. 32 w.	1,219	— 22	0.174
36	Vicksburg, Miss.	e.	142	4,404	5.9	n. 44 e.	112	5.4	n. 53 e.	607	+ 9	0.138
39	New Orleans, La.	ne.	175	5,926	8.0	n. 21 e.	173	15.2	n. 10 e.	2,631	— 11	0.444
42	Little Rock, Ark.	sw.	126	4,184	6.0	s. 48 w.	124	6.9	s. 77 w.	852	+ 29	0.204
44	Galveston, Tex.	se.	181	7,824	10.5	s. 33 e.	198	8.1	s. 57 e.	1,603	— 24	0.205
45	Knoxville, Tenn.	ne.	133	3,072	4.1	n. 5 w.	102	7.3	n. 74 w.	749	— 69	0.244
49	Memphis, Tenn.	s.	125	4,861	6.5	s. 52 w.	92	11.4	s. 64 w.	1,046	+ 12	0.215
50	Nashville, Tenn.	nw.	205	4,231	5.7	s. 86 w.	268	6.4	s. 74 w.	1,728	— 12	0.408
52	Louisville, Ky.	se.	143	5,597	7.5	s. 26 w.	213	11.0	s. 38 w.	2,355	+ 12	0.421
53	Indianapolis, Ind.	se.	159	4,741	6.4	s. 31 w.	210	8.1	s. 36 w.	1,692	+ 5	0.357
54	Cincinnati, Ohio.	se.	199	5,413	7.3	s. 4 w.	164	11.7	s. 64 w.	1,922	+ 60	0.355
55	Columbus, Ohio.	sw.	169	5,722	7.7	s. 42 w.	183	11.7	s. 50 w.	2,142	+ 8	0.374
56	Pittsburg, Pa.	nw.	164	4,433	6.0	s. 81 w.	170	8.7	s. 76 w.	1,474	— 5	0.332
58	Buffalo, N. Y.	nw.	236	8,401	11.3	n. 77 w.	181	24.1	n. 75 w.	4,361	+ 2	0.519
60	Rochester, N. Y.	sw.	271	5,560	7.5	s. 24 w.	288	10.1	s. 49 w.	2,917	+ 25	0.525
62	Cleveland, Ohio.	se.	251	9,671	13.0	s.	232	16.1	s. 24 w.	3,731	+ 24	0.386
64	Toledo, Ohio.	w.	201	7,159	9.6	s. 71 w.	260	13.1	s. 72 w.	3,408	+ 1	0.476
65	Detroit, Mich.	sw.	205	7,620	10.2	s. 60 w.	282	14.2	s. 65 w.	4,009	+ 5	0.526
66	Alpena, Mich.	sw.	156	6,943	9.3	s. 50 w.	188	10.3	s. 52 w.	1,939	+ 2	0.279
67	Grand Haven, Mich.	se.	201	7,826	10.5	s. 18 w.	79	26.9	s. 57 w.	2,128	+ 39	0.272
68	Marquette, Mich.	s.	200	8,496	11.4	s. 65 w.	296	9.7	s. 42 w.	2,897	+ 23	0.341
70	Sault Ste. Marie, Mich.	se.	292	6,698	9.0	s. 23 e.	132	4.3	s. 5 e.	563	+ 18	0.084
71	Chicago, Ill.	s.	155	12,272	16.5	n. 65 w.	186	22.4	s. 37 w.	4,170	+ 78	0.340
72	Milwaukee, Wis.	se.	157	7,180	9.7	s. 32 w.	182	13.2	s. 40 w.	2,401	+ 8	0.334
74	Duluth, Minn.	nw.	252	5,426	7.3	n. 19 w.	242	9.9	n. 22 w.	2,405	— 3	0.443
75	Moorhead, Minn.	nw.	236	9,176	12.3	n. 58 w.	142	5.7	n. 57 w.	868	+ 1	0.088
77	Bismarck, N. Dak.	nw.	244	8,064	10.8	n.	219	14.3	n. 19 w.	3,124	+ 19	0.387
79	Saint Paul, Minn.	se.	230	6,349	8.5	s. 35 w.	177	9.7	s. 47 w.	1,718	+ 12	0.271
81	Davenport, Iowa.	sw.	178	7,364	9.9	s. 21 w.	180	14.2	s. 37 w.	2,551	+ 16	0.346
82	Des Moines, Iowa.	nw.	184	5,912	7.9	s. 77 w.	261	9.6	s. 73 w.	2,494	— 4	0.422
88	Saint Louis, Mo.	se.	161	8,762	11.8	s. 29 w.	278	14.7	s. 40 w.	4,080	+ 11	0.466
90	Kansas City, Mo.	se.	186	6,286	8.4	s. 27 w.	193	9.8	s. 12 w.	1,888	— 15	0.300
92	Omaha, Nebr.	nw.	228	6,324	8.5	s. 69 w.	132	8.2	s. 47 w.	1,083	— 23	0.171
96	Huron, S. Dak.	se.	217	12,072	16.2	s. 87 w.	158	14.9	s. 80 w.	2,357	— 7	0.195
98	Havre, Mont.	w.	224	7,123	9.6	s. 87 w.	383	11.7	s. 80 w.	4,476	— 7	0.628
100	Helena, Mont.	sw.	319	6,418	8.6	s. 77 w.	503	9.7	s. 71 w.	4,895	— 6	0.703
107	Denver, Colo.	s.	195	5,809	7.8	s. 10 w.	168	3.5	s. 28 e.	384	+ 38	0.100
111	Dodge City, Kans.	se.	191	9,139	12.3	s. 11 e.	76	25.0	s. 6 w.	1,898	+ 17	0.208
114	Abilene, Tex.	s.	217	7,305	9.8	s. 5 w.	285	11.1	s. 13 w.	3,167	+ 8	0.434
116	El Paso, Tex.	nw.	216	7,280	9.8	n. 9 w.	192	12.6	n. 22 w.	2,411	+ 13	0.331
117	Santa Fe, N. Mex.	se.	158	4,814	6.5	s. 57 e.	39	11.7	n. 67 w.	458	+ 170	0.095
119	Yuma, Ariz.	ne.	126	3,635	4.9	n. 17 w.	144	7.4	n. 33 w.	1,065	+ 16	0.293
122	Salt Lake City, Utah.	se.	200	4,366	5.9	s. 47 e.	86	5.7	n. 31 w.	487	+ 78	0.112
125	Spokane, Wash.	s.	259	4,919	6.6	s. 1 e.	326	9.5	s. 14 w.	3,099	+ 15	0.630
130	Seattle, Wash.	se.	333	4,627	6.2	s. 62 e.	281	9.1	s. 53 e.	2,551	+ 9	0.551
132	Portland, Oregon.	nw.	231	6,984	9.4	s. 66 w.	256	11.1	n. 60 w.	2,835	— 6	0.406
133	Roseburg, Oregon.	nw.	93	1,872	2.5	s. 63 w.	56	7.6	s. 59 w.	428	— 4	0.229
137	San Francisco, Cal.	sw.	414	6,709	9.0	s. 40 w.	458	11.2	s. 40 w.	5,155	— 0	0.708
140	San Diego, Cal.	w.	160	2,824	4.3	n. 62 w.	306	5.7	n. 71 w.	1,753	— 9	0.621

\* Data for 27 1/4 days.

TABLE IX.—Resultant winds from observations at 8 a. m. and 8 p. m., daily, during October, 1894.

Number.	Station.	Component direction from—				Resultant.		Number.	Station.	Component direction from—				Resultant.	
		N.	S.	E.	W.	Direction from—	Duration.			N.	S.	E.	W.	Direction from—	Duration.
New England.															
1	Eastport, Me.	16	21	16	26	s. 63 w.	11	71	Chicago, Ill.	15	30	14	19	s. 18 w.	16
2	Portland, Me.	16	21	13	24	s. 65 w.	12	72	Milwaukee, Wis.	10	25	16	24	s. 28 w.	17
3	Northfield, Vt.	16	38	6	12	s. 15 w.	23	73	Green Bay, Wis.	15	34	10	18	s. 23 w.	21
4	Boston, Mass.	14	14	17	27	w. ....	10	74	Duluth, Minn.	25	10	17	25	n. 28 w.	17
5	Nantucket, Mass.	18	17	18	22	n. 76 w.	4		North Dakota.						
6	Woods Holl, Mass.	9	10	9	12	s. 72 w.	3	75	Moorhead, Minn.	24	19	12	21	n. 61 w.	10
7	Block Island, R. I.	20	11	19	30	n. 51 w.	14	76	Saint Vincent, Minn.	25	15	18	18	n. ....	10
8	New Haven, Conn.	25	13	10	26	n. 51 w.	21	77	Bismarck, N. Dak.	26	6	23	18	n. 14 e.	21
9	New London, Conn.	20	11	12	27	n. 59 w.	18	78	Williston, N. Dak.	20	16	10	31	n. 79 w.	21
Middle Atlantic States.															
10	Albany, N. Y.	15	31	8	17	s. 39 w.	18	79	Saint Paul, Minn.	9	22	19	29	s. 38 w.	16
11	New York, N. Y.	22	17	16	20	n. 39 w.	6	80	La Crosse, Wis.	11	34	9	19	s. 23 w.	25
12	Harrisburg, Pa.	12	12	21	25	w. ....	4	81	Davenport, Iowa.	9	22	21	25	s. 17 w.	14
13	Philadelphia, Pa.	31	14	14	23	n. 52 w.	11	82	Des Moines, Iowa.	17	19	11	28	s. 83 w.	17
14	Atlantic City, N. J.	17	16	18	23	n. 79 w.	5	83	Keokuk, Iowa.	10	28	12	26	s. 38 w.	23
15	Baltimore, Md.	20	16	16	22	n. 56 w.	7	84	Cairo, Ill.	15	20	10	19	s. 33 w.	17
16	Washington, D. C.	28	14	12	30	n. 30 w.	16	85	Springfield, Ill.	16	31	4	22	s. 50 w.	23
17	Lynchburg, Va.	20	19	13	22	n. 84 w.	9	87	Hannibal, Mo.	5	27	14	29	s. 34 w.	27
18	Norfolk, Va.	26	16	19	19	n. ....	10	88	Saint Louis, Mo.	10	28	15	21	s. 18 w.	19
South Atlantic States.															
19	Charlotte, N. C.	13	24	24	14	s. 42 e.	15	89	Columbia, Mo.	7	12	7	13	s. 50 w.	8
20	Hatteras, N. C.	25	15	17	14	n. 17 e.	10	90	Kansas City, Mo.	10	31	14	21	s. 18 w.	22
21	Kittyhawk, N. C.	23	14	25	19	n. 34 e.	11	91	Springfield, Mo.	16	30	14	17	s. 12 w.	14
22	Raleigh, N. C.	30	16	9	20	n. 38 w.	18	92	Omaha, Nebr.	15	23	19	26	s. 41 w.	11
23	Wilmington, N. C.	26	13	23	17	n. 25 e.	14	93	Valentine, Nebr.	24	15	5	31	n. 71 w.	28
24	Charleston, S. C.	28	13	21	17	n. 15 e.	16	94	Sioux City, Iowa.	24	21	12	18	n. 63 w.	7
25	Augusta, Ga.	26	9	19	17	n. 7 e.	17	95	Pierre, S. Dak.	20	18	14	25	s. 80 w.	11
26	Savannah, Ga.	28	14	19	14	n. 20 e.	15	96	Huron, S. Dak.	19	16	16	28	n. 76 w.	12
27	Jacksonville, Fla.	30	10	19	16	n. 9 e.	20		Northern Slope.						
28								98	Havre, Mont.	12	16	7	40	s. 83 w.	33
29	Jupiter, Fla.	23	15	21	19	n. 14 e.	8	99	Miles City, Mont.	13	21	17	22	s. 32 w.	9
30	Key West, Fla.	21	13	34	6	n. 74 e.	29	100	Helena, Mont.	8	27	2	42	s. 65 w.	44
31	Tampa, Fla.	36	9	22	12	n. 20 e.	29	101	Rapid City, S. Dak.	18	14	6	32	n. 81 w.	26
32	Titusville, Fla.	28	9	22	19	n. 9 e.	19	102	Cheyenne, Wyo.	22	11	4	38	n. 72 w.	36
33								103	Lander, Wyo.	14	26	7	26	s. 58 w.	22
34								105	North Platte, Nebr.	18	19	14	31	s. 87 w.	17
Middle Slope.															
35	Atlanta, Ga.	22	11	20	23	n. 15 w.	11	107	Denver, Colo.	17	25	16	18	s. 14 w.	8
36	Pensacola, Fla.	32	10	20	17	n. 8 e.	23	108	Pueblo, Colo.	27	11	14	26	n. 37 w.	30
37	Mobile, Ala.	39	13	4	18	n. 26 w.	30	109	Concordia, Kans.	15	27	7	20	s. 47 w.	18
38	Montgomery, Ala.	24	12	21	17	n. 18 e.	13	110	Dodge City, Kans.	21	22	21	14	s. 82 e.	7
39	Meridian, Miss.	31	9	23	13	n. 24 e.	24	111	Wichita, Kans.	18	32	11	14	s. 12 w.	14
40	Vicksburg, Miss.	23	15	24	13	n. 54 e.	14	112	Oklahoma, Okla.	15	31	13	19	s. 21 w.	17
41	New Orleans, La.	24	14	24	14	n. 45 e.	14	113							
Western Gulf States.															
42	Shreveport, La.	17	26	21	14	s. 38 e.	11	114	Abilene, Tex.	12	36	15	13	s. 5 e.	24
43	Fort Smith, Ark.	14	11	38	11	n. 84 e.	27	115	Amarillo, Tex.	16	37	4	15	s. 28 w.	24
44	Little Rock, Ark.	18	24	13	20	s. 49 w.	9		Southern Plateau.						
45	Corpus Christi, Tex.	15	27	31	7	s. 63 e.	27	116	El Paso, Tex.	22	7	23	25	n. 8 w.	15
46	Galveston, Tex.	13	31	23	13	s. 29 e.	21	117	Santa Fe, N. Mex.	19	22	22	20	s. 34 e.	4
47	Palestine, Tex.	16	24	23	14	s. 48 e.	12	118	Tucson, Ariz.	17	31	10	20	s. 36 w.	17
48	San Antonio, Tex.	15	21	33	7	s. 77 e.	27	119	Yuma, Ariz.	27	10	17	23	n. 16 w.	18
Ohio Valley and Tennessee.															
49	Chattanooga, Tenn.	15	16	13	28	s. 86 w.	15		Middle Plateau.						
50	Knoxville, Tenn.	23	13	20	21	n. 6 w.	10		Carson City, Nev.	16	19	12	26	s. 78 w.	14
51	Memphis, Tenn.	17	23	15	19	s. 34 w.	7	121	Winnemucca, Nev.	21	15	19	22	n. 27 w.	7
52	Nashville, Tenn.	20	22	4	29	s. 85 w.	25	122	Salt Lake City, Utah.	19	18	21	22	n. 45 w.	1
53	Lexington, Ky.	9	29	13	23	s. 27 w.	22		Northern Plateau.						
54	Louisville, Ky.	10	24	16	24	s. 30 w.	16	123	Baker City, Oreg.	11	33	24	16	s. 20 e.	23
55	Indianapolis, Ind.	15	26	17	22	s. 24 w.	12	124	Idaho Falls, Idaho.	13	33	9	21	s. 31 w.	23
56	Cincinnati, Ohio	10	21	22	19	s. 15 e.	11	125	Spokane, Wash.	9	40	13	12	s. 2 e.	31
57	Columbus, Ohio	18	25	13	21	s. 49 w.	11	126	Walla Walla, Wash.	6	39	13	13	s. ....	33
58	Pittsburg, Pa.	15	19	13	29	s. 76 w.	16		North Pacific Coast Region.						
59	Parkersburg, W. Va.	5	28	25	16	s. 21 e.	25	127	Fort Canby, Wash.	19	19	24	18	e. ....	6
60								129	Port Angeles, Wash.	3	26	17	20	s. 7 w.	25
61	Buffalo, N. Y.	19	17	17	26	n. 77 w.	9	130	Seattle, Wash.	20	22	25	10	s. 82 e.	15
62	Oswego, N. Y.	9	31	18	21	s. 8 w.	22	131	Tatoosh Island, Wash.	5	24	26	16	s. 28 e.	22
63	Rochester, N. Y.	2	33	18	25	s. 13 w.	32	132	Portland, Oreg.	19	33	4	21	s. 51 w.	22
64	Erie, Pa.	12	32	12	30	s. 22 w.	22	133	Roseburg, Oreg.	21	16	16	20	n. 39 w.	6
65	Cleveland, Ohio.	8	30	24	19	s. 13 e.	23		Middle Pacific Coast Region.						
66	Sandusky, Ohio.	8	27	12	26	s. 36 w.	24	134	Eureka, Cal.	18	23	18	23	s. 45 w.	7
67	Toledo, Ohio.	15	21	9	31	s. 75 w.	23	135	Red Bluff, Cal.	24	25	8	19	s. 85 w.	11
68	Detroit, Mich.	9	30	13	33	s. 61 w.	23	136	Sacramento, Cal.	12	33	15	17	s. 5 w.	21
69								137	San Francisco, Cal.	2	42	4	33	s. 36 w.	49
South Pacific Coast Region.															
70	Alpena, Mich.	15	24	13	27	s. 57 w.	17		South Pacific Coast Region.						
71	Grand Haven, Mich.	16	20	21	21	s. ....	4	138	Fresno, Cal.	27	7	15	29	n. 35 w.	24
72	Marquette, Mich.	20	25	8	22	s. 70 w.	15	139	Los Angeles, Cal.	16	10	14	32	n. 72 w.	19
73	Port Huron, Mich.	13	28	10	28	s. 48 w.	24	140	San Diego, Cal.	24	7	10	27	n. 45 w.	24
74	Sault Ste. Marie, Mich.	17	24	28	16	s. 60 e.	14	141	San Luis Obispo, Cal.	28	16	14	19	n. 23 w.	13

\* Keeler discontinued and Carson City opened.



TABLE Xa.—Temperature data for selected voluntary stations, Oct., 1894.

State and station.	Normal for month.	Length of record.	Mean, Oct., 1894.	Departure from the normal.	Extreme monthly means.			
					Highest.	Year.	Lowest.	Year.
Arizona.	°	Years	°	°	°		°	
Fort Apache .....	55.8	22	57.5	+ 1.7	60.0	1875	50.6	1883
Whipple Barracks .....	54.8	23	56.1	+ 1.3	62.2	1875	49.9	1883
Arkansas.								
Keesee Ferry .....	60.0	12	59.9	— 0.1	64.0	1881	56.0	1885
California.								
Riverside .....	63.6	12	64.8	+ 1.2	67.2	1885	60.7	1896
Colorado.								
Las Animas .....	52.9	11	54.2	+ 1.3	57.1	1889	49.4	1883
Florida.								
Merritts Island .....	75.4	12	76.0	+ 0.6	79.0	1882	72.9	1891
Georgia.								
Forsyth .....	67.0	20	68.0	+ 1.0	75.4	1884	61.7	1885
Idaho.								
Boise Barracks .....	50.0	20	51.5	+ 1.5	56.9	1872	44.5	1883
Fort Sherman .....	46.5	11	47.4	+ 0.9	50.8	1889	41.2	1883
Indiana.								
Lafayette .....	52.9	12	54.1	+ 1.2	56.4	1881	47.9	1889
Iowa.								
Cresco .....	46.1	22	49.2	+ 3.1	54.1	1879	41.2	1873
Kansas.								
Eureka Ranch .....	55.4	11	57.0	+ 1.6	62.9	1886	51.0	1883
Independence .....	58.7	22	61.8	+ 3.1	63.0	1881	52.2	1873
Salina .....	57.4	11	65.2	+ 7.8	65.2	1894	52.0	1883
Louisiana.								
Grand Coteau .....	67.9	13	65.4	— 2.5	75.5	1883	63.4	1891
Maine.								
Orono .....	45.7	23	46.4	+ 0.7	49.7	1879	42.1	1888
Maryland.								
Cumberland .....	53.1	23	55.0	+ 1.9	60.0	1881	48.0	1888
Michigan.								
Kalamazoo .....	50.2	18	51.8	+ 1.6	54.5	1879	45.7	1887
Missouri.								
Sedalia .....	57.3	12	59.5	+ 2.2	61.4	1886	51.3	1883
Montana.								
Fort Custer .....	47.7	15	44.5	— 3.2	55.0	1891	42.2	1883
Nebraska.								
Fort Robinson .....	48.8	11	51.2	+ 2.4	53.6	1884	41.4	1883
Genoa (near) .....	49.6	18	54.2	+ 4.6	55.9	1886	45.0	1883
Nevada.								
Carson City .....	48.7	17	50.6	+ 1.9	55.1	1875	44.0	1883
New Hampshire.								
Hanover .....	45.2	23	48.7	+ 3.5	52.4	1879	40.5	1888
New Mexico.								
Fort Wingate .....	52.4	23	53.9	+ 1.5	57.8	1875	47.2	1871
New York.								
Cooperstown .....	46.5	23	48.8	+ 2.3	53.3	1879	41.5	1888
Plattsburg Barracks .....	47.2	23	50.1	+ 2.9	53.6	1879	42.1	1888
North Carolina.								
Lenoir .....	56.3	23	56.3	0.0	66.4	1878	48.0	1874
Oklahoma.								
Fort Reno .....	61.0	10	64.2	+ 3.2	65.6	1888	57.1	1887
Fort Sill .....	62.1	22	61.9	— 0.2	70.0	1874	57.7	1885
Fort Supply .....	58.5	14	60.1	+ 1.6	62.2	1874	54.4	1885
Oregon.								
Bandon .....	52.0	10	54.4	+ 2.4	55.2	1889	47.0	1886
Pennsylvania.								
Dyberry .....	46.4	21	49.2	+ 2.8	53.4	1879	41.3	1888
Grampian .....	47.7	23	51.4	+ 3.7	56.4	1879	43.4	1888
Wellaboro .....	48.0	14	50.1	+ 2.1	54.2	1881	41.2	1889
South Carolina.								
Statesburg .....	62.9	13	64.0	+ 1.1	69.0	1881	58.7	1891
South Dakota.								
Fort Sully .....	49.0	23	.....	.....	56.0	1879	42.1	1873
Texas.								
Austin .....	67.7	22	72.4	+ 4.7	73.6	1883	63.0	1873
Silver Falls .....	62.3	8	63.2	+ 0.9	64.4	1890	59.7	1887
Utah.								
Terrace .....	52.3	18	57.5	+ 5.2	67.1	1887	45.8	1878
Vermont.								
Stratford .....	46.7	21	47.2	+ 0.5	53.8	1879	40.6	1888
Virginia.								
Dale Enterprise .....	56.5	14	54.7	— 1.8	61.3	1886	48.2	1890
Washington.								
Fort Townsend .....	50.4	18	48.8	— 1.6	54.6	1875	46.4	1893
Wisconsin.								
Madison .....	49.0	23	50.4	+ 1.4	58.2	1879	44.1	1887
Wyoming.								
Fort Washakie .....	43.6	11	45.8	+ 2.2	47.2	1889	39.9	1881

TABLE Xb.—Precipitation data for selected voluntary stations, Oct., 1894.

State and station.	Normal for month.	Length of record.	Total, Oct., 1894.	Departure from the normal.	Extremes.			
					Greatest.		Least.	
					Amt.	Year.	Amt.	Year.
Arizona.	Inches.	Years	Inches.	Inches.	Inches.		Inches.	
Fort Apache .....	1.19	18	2.47	+ 1.28	4.68	1881	0.00	1878, 1891
Whipple Barracks .....	0.68	23	1.37	+ 0.69	1.76	1889	0.00	*
Arkansas.								
Keesee Ferry .....	3.81	13	2.34	— 1.47	18.11	1883	0.10	1886
California.								
Riverside .....	0.32	14	0.06	— 0.26	1.28	1889	0.00	1886, 1891
Colorado.								
Las Animas .....	0.47	13	0.00	— 0.47	1.19	1885	0.00	1884
Florida.								
Merritts Island .....	5.68	16	2.14	— 3.54	11.94	1886	1.33	1889
Georgia.								
Forsyth .....	2.70	20	5.92	+ 3.22	7.86	1879	T.	1891
Idaho.								
Boise Barracks .....	0.97	21	2.46	+ 1.49	4.06	1883	0.02	1891
Fort Sherman .....	2.05	11	2.65	+ 0.60	5.50	1893	0.59	1882
Indiana.								
Lafayette .....	2.36	12	1.05	— 1.31	5.56	1883	0.73	1886
Iowa.								
Cresco .....	2.36	23	3.64	+ 1.28	8.06	1881	0.13	1889
Kansas.								
Eureka Ranch .....	1.25	11	0.38	— 0.87	4.50	1883	T.	1893
Independence .....	2.76	22	1.31	— 1.45	7.16	1883	0.19	1874
Salina .....	2.34	11	1.12	— 1.22	8.80	1883	0.40	1885
Louisiana.								
Grand Coteau .....	2.35	11	0.89	— 1.46	4.98	1890	T.	1889
Maine.								
Orono .....	4.06	23	4.33	+ 0.27	7.51	1888	1.09	1882
Maryland.								
Cumberland .....	2.42	23	2.25	— 0.17	6.65	1890	0.00	1879
Michigan.								
Kalamazoo .....	2.76	18	2.53	— 0.23	6.57	1881	0.31	1892
Missouri.								
Sedalia .....	2.70	16	0.52	— 2.18	7.07	1883	0.51	1878
Montana.								
Fort Custer .....	1.25	15	1.99	+ 0.74	4.60	1891	0.24	1885
Nebraska.								
Fort Robinson .....	1.70	11	0.11	— 1.59	8.60	1887	T.	1888
Genoa (near) .....	1.54	18	1.48	— 0.06	3.48	1891	0.25	1879
Nevada.								
Carson City .....	0.39	17	0.29	— 0.10	1.61	1882	T.	*
New Hampshire.								
Hanover .....	3.32	23	2.82	— 0.50	5.57	1873	0.53	1876
New Mexico.								
Fort Wingate .....	0.90	23	1.27	+ 0.37	2.75	1872	0.00	*
New York.								
Cooperstown .....	3.19	23	4.73	+ 1.54	5.91	1890	1.19	1887
Plattsburg Barracks .....	2.40	23	3.03	+ 0.63	5.15	1873	0.46	1879
North Carolina.								
Lenoir .....	3.39	23	5.38	+ 1.99	9.50	1885	T.	1892
Oklahoma.								
Fort Reno .....	3.38	11	1.49	— 1.89	6.82	1883	0.00	1893
Fort Sill .....	2.56	22	1.09	— 1.47	8.02	1877	0.00	1893
Fort Supply .....	1.35	14	0.49	— 0.86	4.99	1889	0.00	*
Oregon.								
Bandon .....	5.42	16	9.84	+ 4.42	11.80	1889	1.16	1880
Pennsylvania.								
Dyberry .....	3.31	23	5.43	+ 2.12	7.39	1890	0.82	1892
Grampian .....	2.89	17	2.97	+ 0.08	6.36	1890	0.59	1892
Wellaboro .....	3.31	15	3.61	+ 0.30	7.50	1885	0.33	1892
South Carolina.								
Statesburg .....	2.85	13	4.51	+ 1.66	8.15	1887	0.02	1884
South Dakota.								
Fort Sully .....	0.63	23	.....	.....	3.00	1893	0.02	1872
Texas.								
Austin .....	2.37	22	1.30	— 1.07	8.06	1871	0.00	1893
Silver Falls .....	2.13	8	0.20	— 1.93	3.63	1892	0.05	1893
Utah.								
Terrace .....	0.16	20	T.	— 0.16	0.75	1889	0.00	*
Vermont.								
Stratford .....	3.18	21	3.10	— 0.08	6.80	1873	1.20	1882
Virginia.								
Dale Enterprise .....	3.17	14	2.36	— 0.81	12.60	1885	0.19	1892
Washington.								
Fort Townsend .....	1.94	18	2.00	+ 0.06	3.58	1875	1.00	1885
Wisconsin.								
Madison .....	2.63	23	1.77	— 0.86	9.12	1881	T.	1889
Wyoming.								
Fort Washakie .....	1.21	11	00.0	— 1.21	3.50	1891	0.00	1894

\* Frequently.

TABLE XI.—Thunderstorms and auroras, October, 1894.

States.	No. of stations.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	Total.				
Alabama.....	51	T.			I			I	I																					I			4	T.			
Arizona.....	45	T.				I													3	2	I						6						13	T.			
Arkansas.....	44	T.	6			I						2	I								I	I							5				17	T.			
Colorado.....	74	T.				I	I														3		I										7	T.			
California.....	394	T.																																1	T.		
Connecticut.....	25	T.											2																					2	T.		
Delaware.....	7	T.																																3	T.		
District of Columbia...	4	T.																																	1	T.	
Florida.....	35	T.		2	2	4	4	3				I		2																	2		20	T.			
Georgia.....	60	T.				I																						I		I				3	T.		
Idaho.....	26	T.				I														2	I		I											7	T.		
Illinois.....	57	T.	4			I							I							7	I	11					13	I						39	T.		
Indiana.....	43	T.	4																	5		3	I	I			4	2						20	T.		
Indian Territory.....	7	T.																												I				2	T.		
Iowa.....	83	T.					I	2					I						3	I	15	3				4	8							39	T.		
Kansas.....	67	T.	5	I			4	4	3						I				3		6	I							3					32	T.		
Kentucky.....	40	T.				I																													7	T.	
Louisiana.....	46	T.	5	3									3	I															8	5				25	T.		
Maine.....	18	T.																																	11	T.	
Maryland.....	29	T.	3																										3		I	I			15	T.	
Massachusetts.....	80	T.																																	16	T.	
Michigan.....	85	T.	1	2	3																5	5	7	I	6	I	I							33	T.		
Minnesota.....	64	T.	1	4				10												8	4	15	11	6	5	2	7	I	3	I	3	I		78	T.		
Mississippi.....	48	T.																																	4	T.	
Missouri.....	93	T.	6	8					3	2	I		2	9	I	8											10		3	5				102	T.		
Montana.....	28	T.					2																												1	T.	
Nebraska.....	81	T.	2				I	6	I																										22	T.	
Nevada.....	48	T.																																	5	T.	
New Hampshire.....	25	T.																																	9	T.	
New Jersey.....	59	T.																																	4	T.	
New Mexico.....	39	T.																																	3	T.	
New York.....	92	T.																																	23	T.	
North Carolina.....	53	T.																																	35	T.	
North Dakota.....	34	T.																																	6	T.	
Ohio.....	142	T.		2	14	I	I					I	I	2	4																				27	T.	
Oklahoma.....	18	T.																																	4	T.	
Oregon.....	64	T.																																		5	T.
Pennsylvania.....	85	T.																																		40	T.
Rhode Island.....	9	T.																																		5	T.
South Carolina.....	45	T.																																		16	T.
South Dakota.....	43	T.																																		11	T.
Tennessee.....	42	T.																																		11	T.
Texas.....	80	T.																																		18	T.
Utah.....	27	T.																																		6	T.
Vermont.....	14	T.																																		9	T.
Virginia.....	35	T.																																			



TABLE XII. — Climatological data from the monthly reports of the State Weather Service, October, 1894.

State.	Temperature.				Precipitation.				Director.								
	Mean departure.	Maximum.	Minimum.	Date.	Station.	Monthly ranges.		Station.		Mean departure.	Precipitation.						
						Greatest.	Station.				Least.	Station.	Amount.	Station.	Amount.		
Alabama.....	-1.3	95	36	15	Decatur	63	0	Brewton	35	Citronelle	0.45	Union Springs	6.19	Jacks	0.11	Pushmataha.....	F. P. Chaffee.
Alaska.....	-0.3	107	21	28	Kearns Canyon	68	0	Parker	47	Mount Hunchua.....	-0.35	Fort Apache.....	2.47	T	0.10	Parker	Not yet organized.
Arizona.....	-1.1	93	24	31	Keesees Ferry	63	0	Keesees Ferry	42	Mount Nello.....	-0.70	Dallas.....	3.79	0	0.10	Bee Branch.....	W. R. Burrows.
Arkansas.....	-0.8	116	24	28	Salton	68	0	Greenville	30	Eureka.....	-0.41	Dunsmuir.....	9.95	0	0.00	Anaheim	F. H. Clarke.
California.....	-2.8	94	26	15	Climax	74	0	Husted	41	Lay.....	-0.22	Buby.....	4.37	0	0.00	Avoca	F. H. Brandenburg.
Colorado.....	-1.0	85	31	16	New Hartford	40	0	New Hartford	44	Dover.....	-0.40	Middletown.....	3.68	0	3.68	N. Grosvenor Dale.	C. P. Cronk.
Connecticut.....	-0.1	92	40	31	Green Cove Springs	47	0	Archer	17	Key West.....	-1.14	Moseley Hall.....	7.36	0	3.56	Newark	See Maryland.
Delaware.....	-0.6	95	28	15	Clayton	60	0	Bray	41	Griffin	-1.39	Blakely.....	7.74	0	1.00	Amelia	E. R. Demain.
District of Columbia.....	-0.9	89	22	22	Payette.....	64	0	Payette.....	43	Griffin	-1.39	Blakely.....	7.74	0	1.00	Lafayette.....	George E. Hunt.
Florida.....	-0.9	89	22	22	Payette.....	64	0	Payette.....	43	Griffin	-1.39	Blakely.....	7.74	0	1.00	American Falls.....	D. P. McCallum.
Georgia.....	-1.7	89	25	15	Marion	60	0	East Peoria.....	42	Halliday	-0.43	Halliday.....	3.40	0	0.31	East Peoria.....	John Craig.
Idaho.....	-1.7	89	25	15	Marion	60	0	Butterville.....	44	South Bond.....	-0.73	Marengo.....	3.30	0	0.75	Crawfordsville	Prof. R. A. Huston.
Indian Territory.....	-1.4	92	24	24	Glenwood	64	0	Glenwood	46	Davenport.....	-0.18	Ames.....	5.25	0	0.63	Mechanicsville.....	J. R. Sage.
Iowa.....	-2.2	90	20	14	Ulysses.....	73	0	Hays City.....	51	Emporia.....	-0.45	Atchison.....	4.33	0	0.63	Coolidge	T. B. Jennings.
Kansas.....	-2.1	97	17	13	Russellville.....	63	0	Shawnee.....	36	Port Eads.....	-1.40	Castlesburg.....	7.30	0	0.00	Alpha.....	Frank Burke.
Kentucky.....	-1.4	92	23	15	Camerton.....	63	0	Oxford.....	36	Eastport.....	-1.07	Calhoun.....	7.79	0	0.00	Maurepas.....	R. E. Kerka.
Louisiana.....	-1.0	82	20	14	Solomons.....	55	0	Sunnyvale.....	41	Fallston.....	-0.87	Darlington.....	7.25	0	2.41	Fairfield.....	J. Warren Smith.
Maine.....	-1.4	92	23	15	Camerton.....	63	0	Oxford.....	36	Eastport.....	-1.07	Calhoun.....	7.79	0	0.00	Alpha.....	T. B. Jennings.
Maryland.....	-1.1	88	20	14	Solomons.....	55	0	Sunnyvale.....	41	Fallston.....	-0.87	Darlington.....	7.25	0	2.41	Maurepas.....	R. E. Kerka.
Massachusetts.....	-1.8	94	18	10	Elmira.....	72	0	Elmira.....	45	Great Falls.....	-0.69	Tecumseh.....	8.86	0	0.00	Emma	A. E. Hackett.
Michigan.....	-1.3	92	15	8	Billings.....	73	0	Chadron.....	44	Burwell.....	-0.69	Tecumseh.....	8.86	0	0.00	Mingusville.....	R. M. Crawford.
Minnesota.....	-0.4	82	18	10	Polk.....	60	0	Empire Ranch.....	48	Austin.....	-0.69	Leawards Ranch.....	2.51	0	0.00	Ogallala.....	Prof. G. D. Seesey.
Mississippi.....	-0.5	96	26	31	Vaiden.....	66	0	North Conway.....	38	Lancaster.....	-0.69	Newton.....	2.51	0	0.00	Austin	Prof. C. W. Friend.
Missouri.....	-1.8	94	18	10	Elmira.....	72	0	Elmira.....	45	Great Falls.....	-0.69	Tecumseh.....	8.86	0	0.00	Keene	J. Warren Smith.
Montana.....	-1.9	82	15	8	O'Neill.....	60	0	Empire Ranch.....	48	Lancaster.....	-0.69	Newton.....	2.51	0	0.00	Cape May.....	E. W. McGann.
Nebraska.....	-1.3	92	15	8	Billings.....	73	0	Chadron.....	44	Burwell.....	-0.69	Tecumseh.....	8.86	0	0.00	Albert	H. B. Hersey.
Nevada.....	-0.7	94	18	10	Polk.....	60	0	Empire Ranch.....	48	Austin.....	-0.69	Leawards Ranch.....	2.51	0	0.00	Fort Niagara.....	Prof. E. A. Fuertes.
New Hampshire.....	-2.9	76	23	20	Nashua.....	51	0	North Conway.....	38	Lancaster.....	-0.69	Newton.....	2.51	0	0.00	Bakersville.....	Dr. H. B. Battle.
New Jersey.....	-1.0	87	23	11	Beverly.....	58	0	Woodbine.....	35	Newark.....	-0.45	Toms River.....	8.33	0	0.35	Portal	B. H. Bronson.
New Mexico.....	-1.0	87	23	11	Beverly.....	58	0	Woodbine.....	35	Newark.....	-0.45	Toms River.....	8.33	0	0.35	Lowell.....	L. N. Bonham.
New York.....	-2.7	85	25	15	Watertown.....	55	0	Watertown.....	33	North Hammond.....	-0.40	Setauket.....	9.28	0	0.42	Fort Supply.....	J. I. Widmeyer.
North Carolina.....	-2.7	85	25	15	Watertown.....	55	0	Watertown.....	33	North Hammond.....	-0.40	Setauket.....	9.28	0	0.42	Greenville.....	W. P. Tatham.
North Dakota.....	-0.6	77	16	29	Bismarck.....	61	0	White Earth.....	40	St. John.....	-0.61	Wild Rice.....	3.17	0	0.65	Black Island.....	J. Warren Smith.
Ohio.....	-2.1	90	15	15	Milford.....	68	0	New Waterford.....	42	Cedarville.....	-0.56	Lehigh.....	3.63	0	0.49	Branchville.....	J. W. Bauer.
Oklahoma.....	-2.6	95	24	29	Wellston.....	58	0	Somerset.....	27	Easton.....	-0.78	Kingston.....	7.66	0	0.50	Cross.....	S. W. Glenn.
Oregon.....	-2.6	95	24	29	Wellston.....	58	0	Somerset.....	27	Easton.....	-0.78	Kingston.....	7.66	0	0.50	Jackson.....	J. B. Marbury.
Pennsylvania.....	-2.6	95	24	29	Wellston.....	58	0	Somerset.....	27	Easton.....	-0.78	Kingston.....	7.66	0	0.50	Alice	D. D. Bryan.
Rhode Island.....	-2.6	95	24	29	Wellston.....	58	0	Somerset.....	27	Easton.....	-0.78	Kingston.....	7.66	0	0.50	Losee.....	J. H. Smith.
South Carolina.....	-0.3	98	33	10	Cheraw.....	55	0	Spartanburg.....	36	Port Royal.....	-1.82	Santee.....	8.34	0	0.50	St. Johnsbury.....	J. Warren Smith.
South Dakota.....	-0.3	98	33	10	Cheraw.....	55	0	Spartanburg.....	36	Port Royal.....	-1.82	Santee.....	8.34	0	0.50	Big Stone Gap.....	Dr. E. A. Craighill.
Tennessee.....	-0.8	90	25	10	Brownsville.....	63	0	Oelrichs.....	45	Gary.....	-1.40	Webster.....	9.10	0	1.87	Fort Spokane.....	G. N. Salisbury.
Texas.....	-2.9	103	25	29	Hartley.....	78	0	Brownsville.....	44	Rogersville.....	-1.79	Parkville.....	2.48	0	0.00	Huntington.....	W. W. Dent.
Utah.....	-1.4	94	9	27	Loa.....	74	0	Fort Hancock.....	34	Haskell.....	-1.75	Boerne.....	2.72	0	1.05	Columbus.....	S. E. Enery.
Vermont.....	-3.6	74	22	10	Jacksonville.....	46	0	Fillmore.....	33	Levan.....	-0.13	Coalville.....	1.12	0	0.00	Fort Washakie.....	E. M. Ravenscroft.
Virginia.....	-2.0	89	25	19	Big Stone Gap.....	43	0	Hartland.....	31	Burlington.....	-0.93	Enochs Falls.....	2.56	0	1.77	Big Stone Gap.....	Dr. E. A. Craighill.
Washington.....	-2.0	89	25	19	Big Stone Gap.....	43	0	Big Stone Gap.....	31	Burlington.....	-0.93	Enochs Falls.....	2.56	0	1.77	Fort Spokane.....	G. N. Salisbury.
West Virginia.....	-2.0	89	25	19	Big Stone Gap.....	43	0	Big Stone Gap.....	31	Burlington.....	-0.93	Enochs Falls.....	2.56	0	1.77	Huntington.....	W. W. Dent.
Wisconsin.....	-1.1	83	16	16	Prairie du Chien.....	65	0	Nuttallburg.....	35	Mayfield.....	-0.94	Ashtland.....	7.63	0	1.05	Columbus.....	S. E. Enery.
Wyoming.....	0.0	91	6	28	Fort Laramie.....	83	0	Meadow Valley.....	52	Cheyenne.....	-0.33	Sundance.....	2.75	0	0.00	Fort Washakie.....	E. M. Ravenscroft.

† At other points in the State.

\* Two or more days.





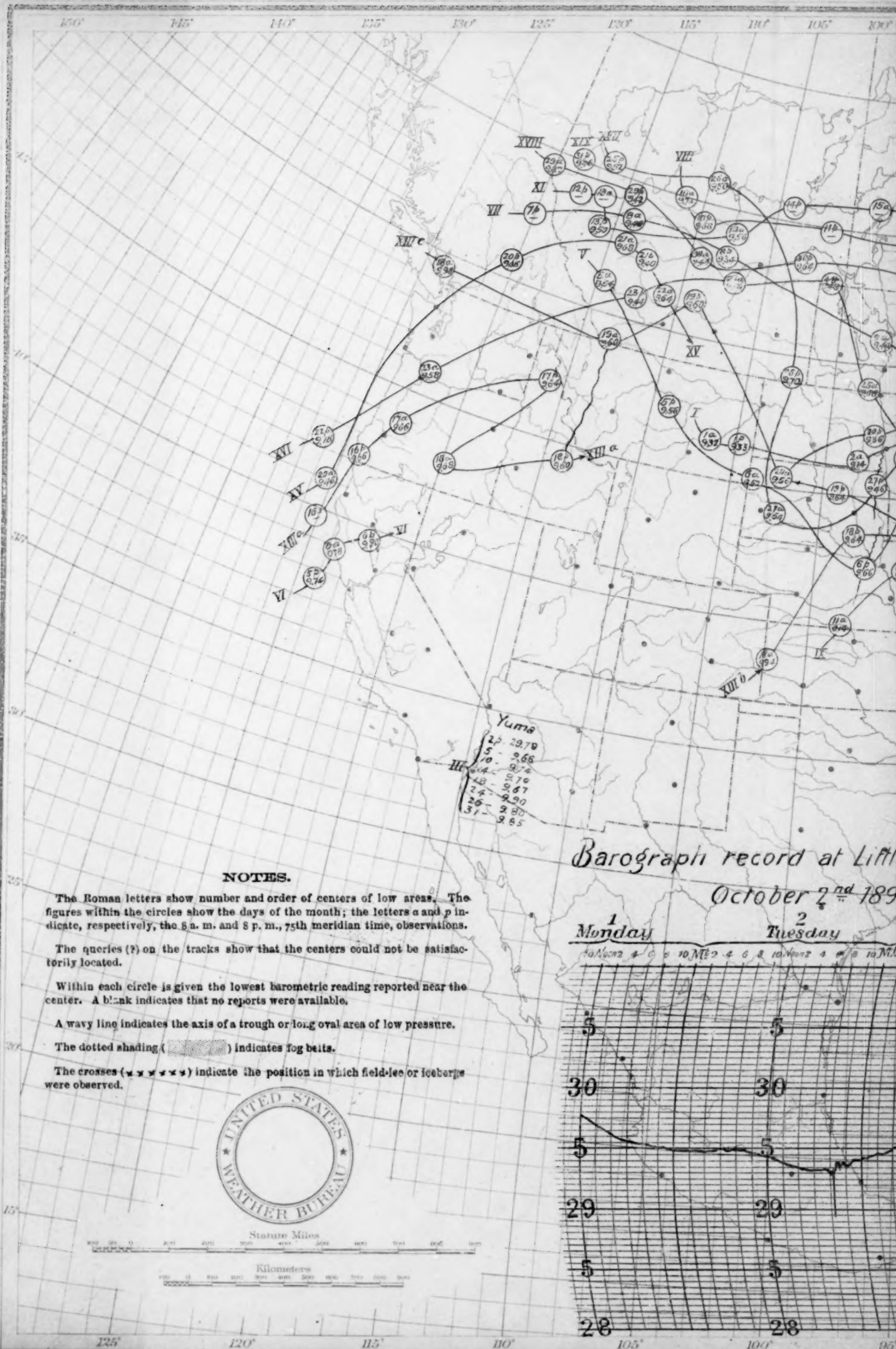
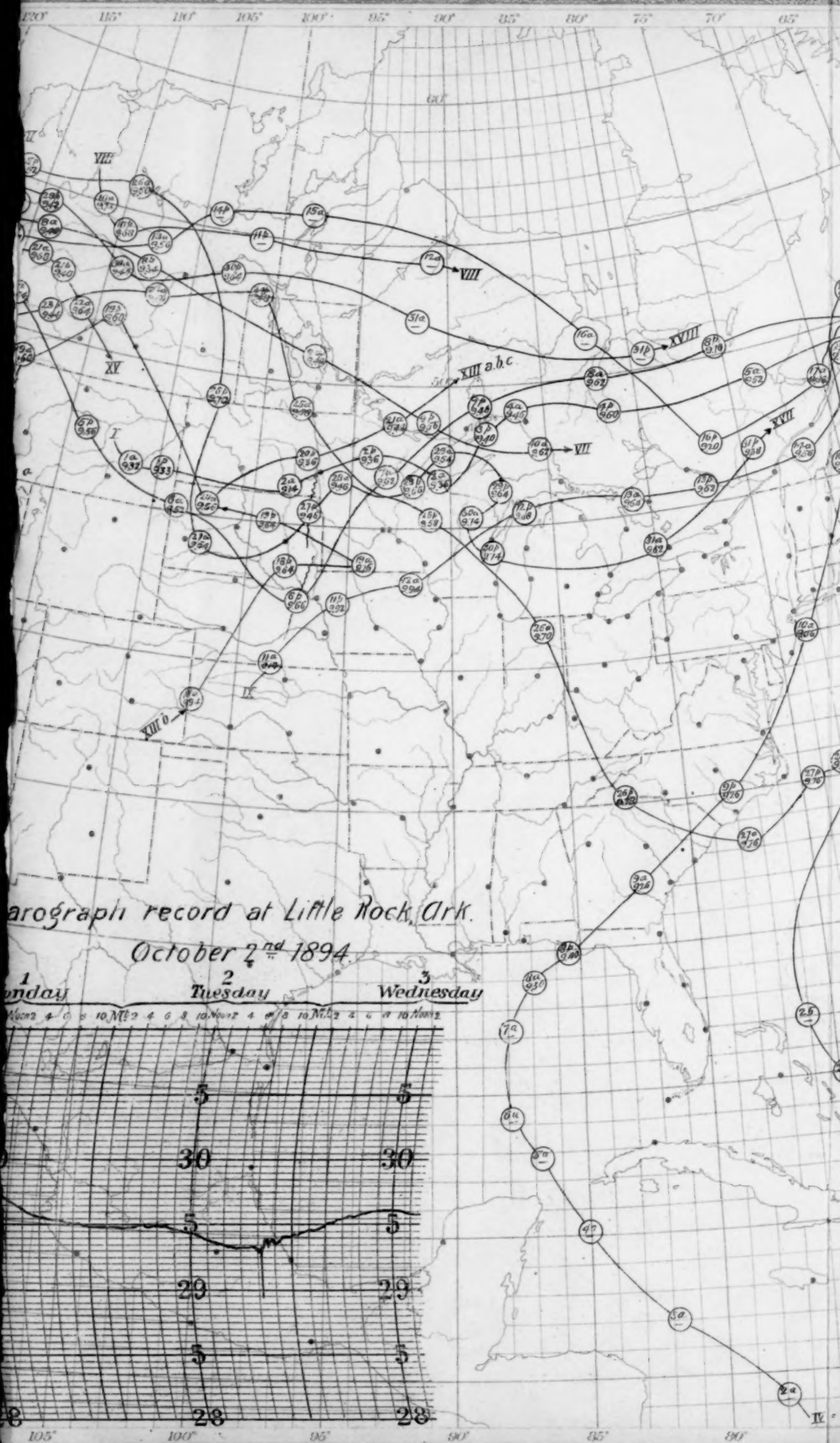
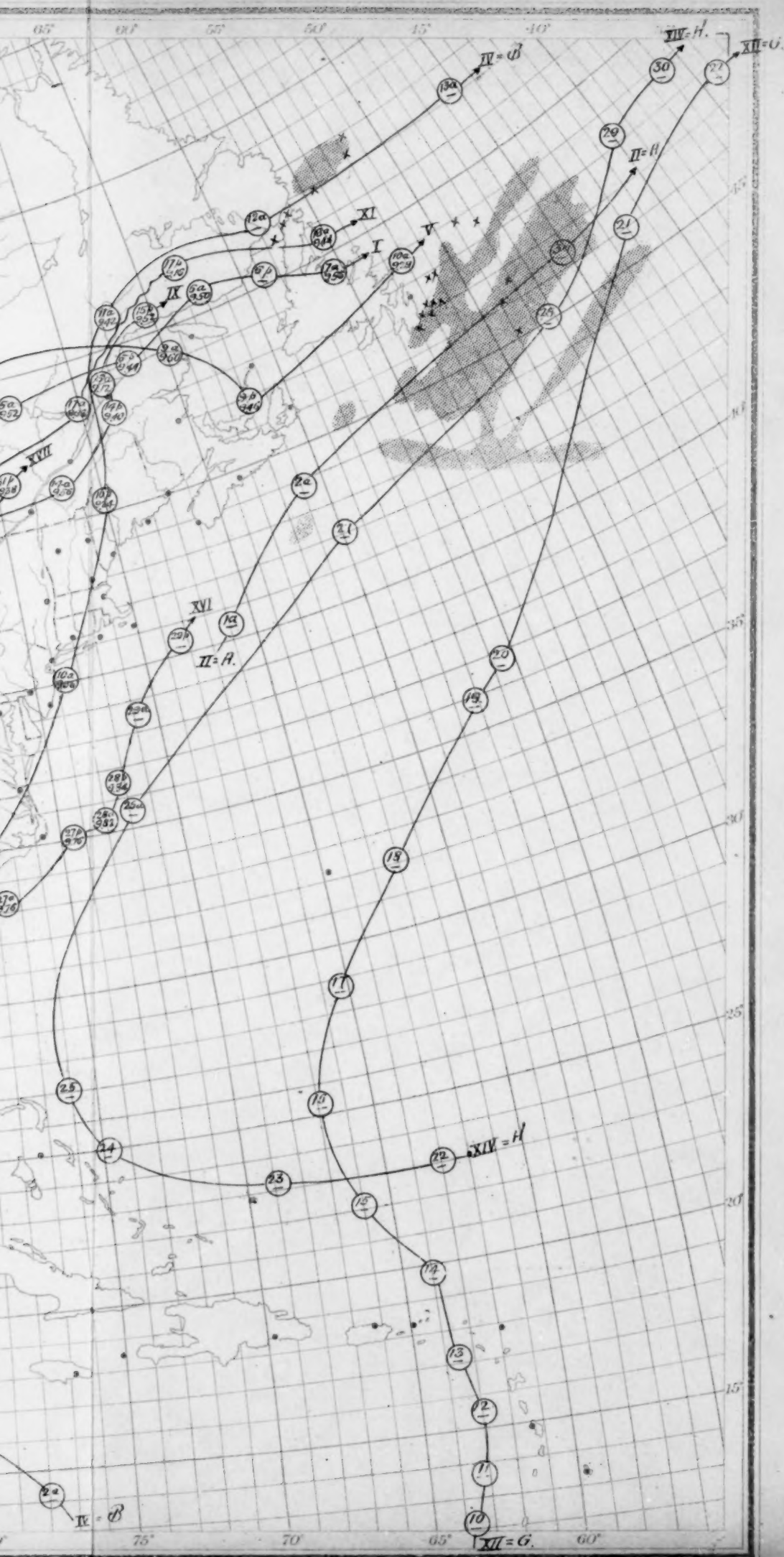


Chart I. Tracks of Centers of Low Areas. October, 1894.







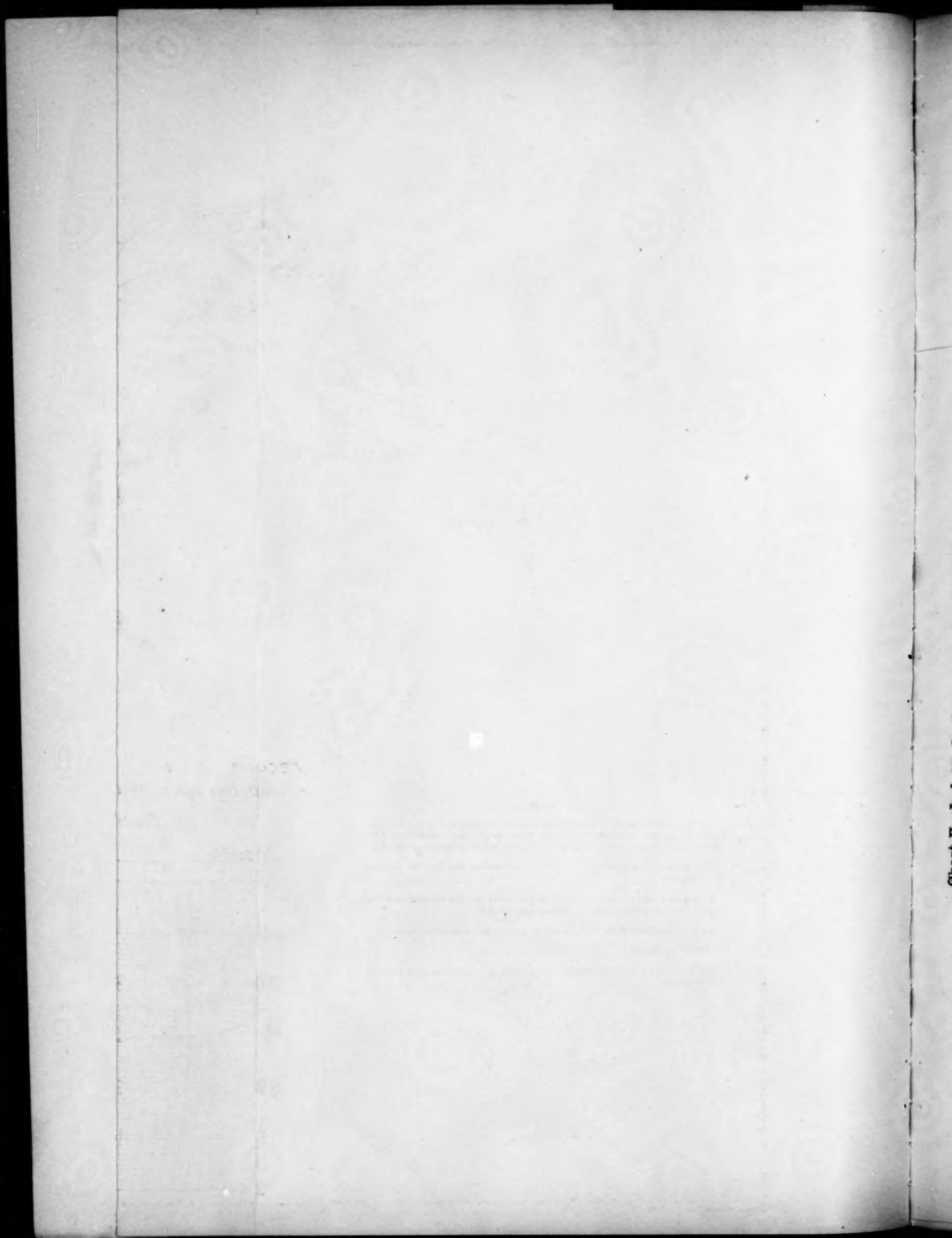




Chart II. Isobars, Isotherms, and Resultant Winds. October, 1894.

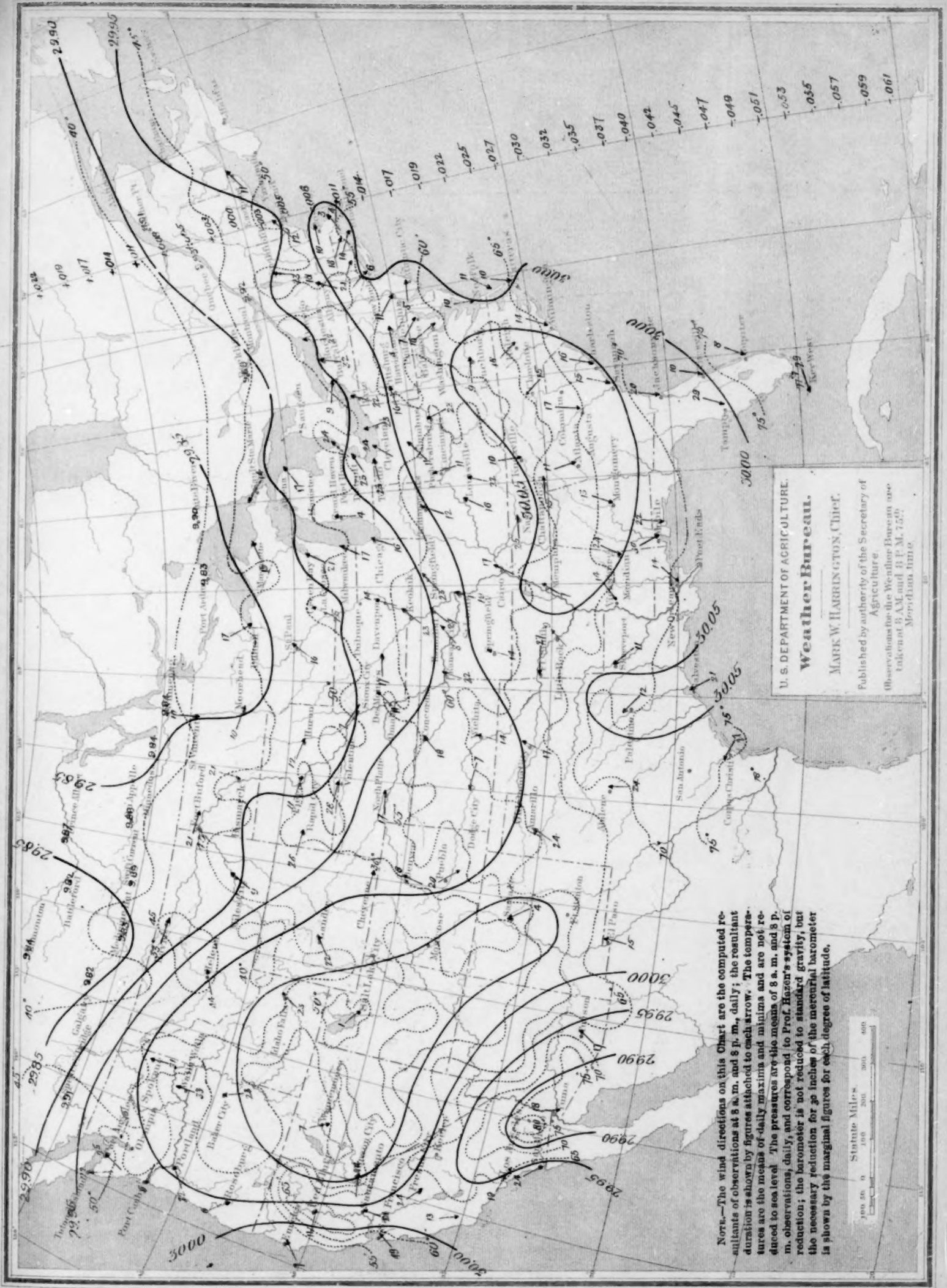






Chart III. Total Precipitation. October, 1894.

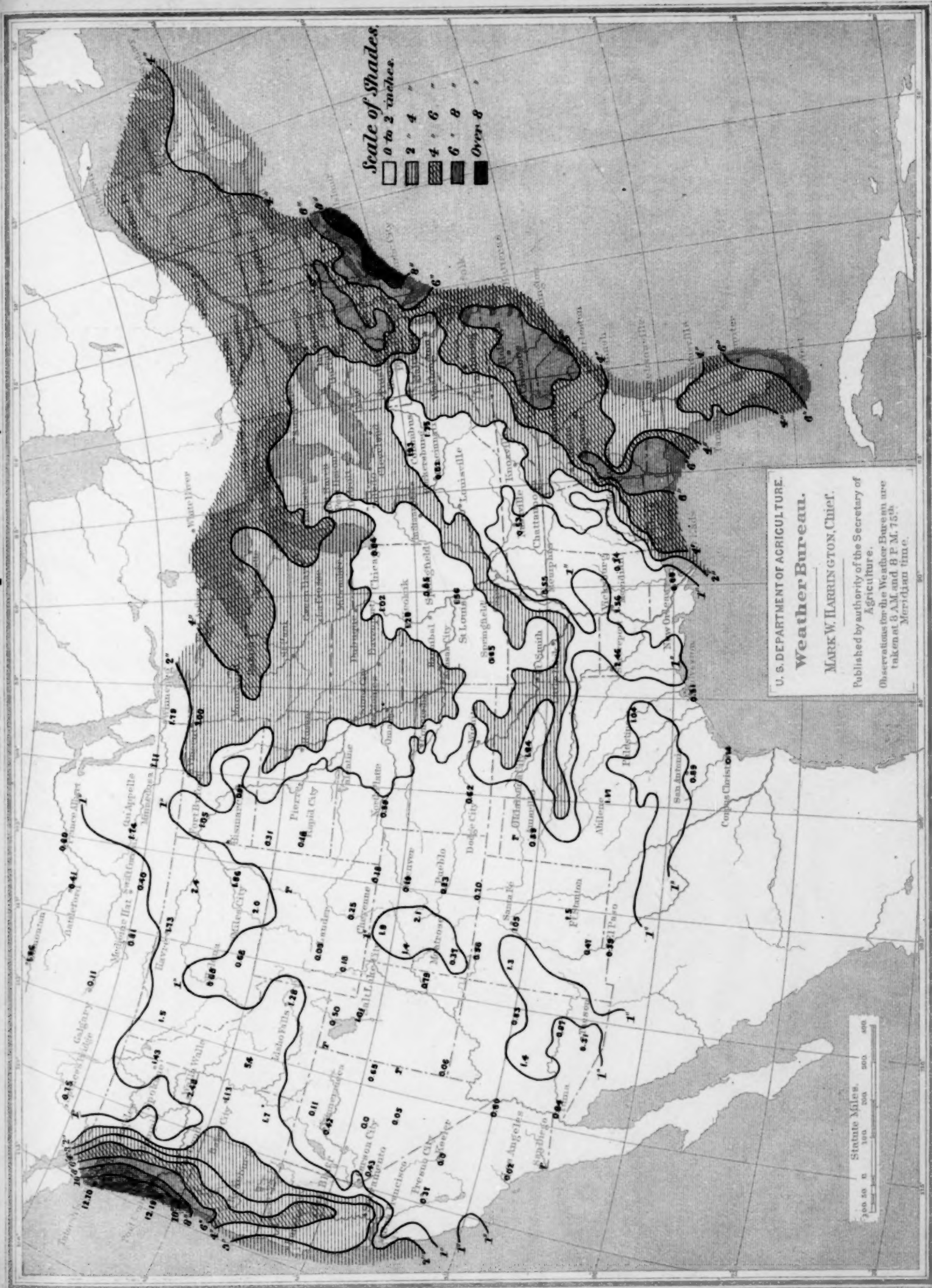
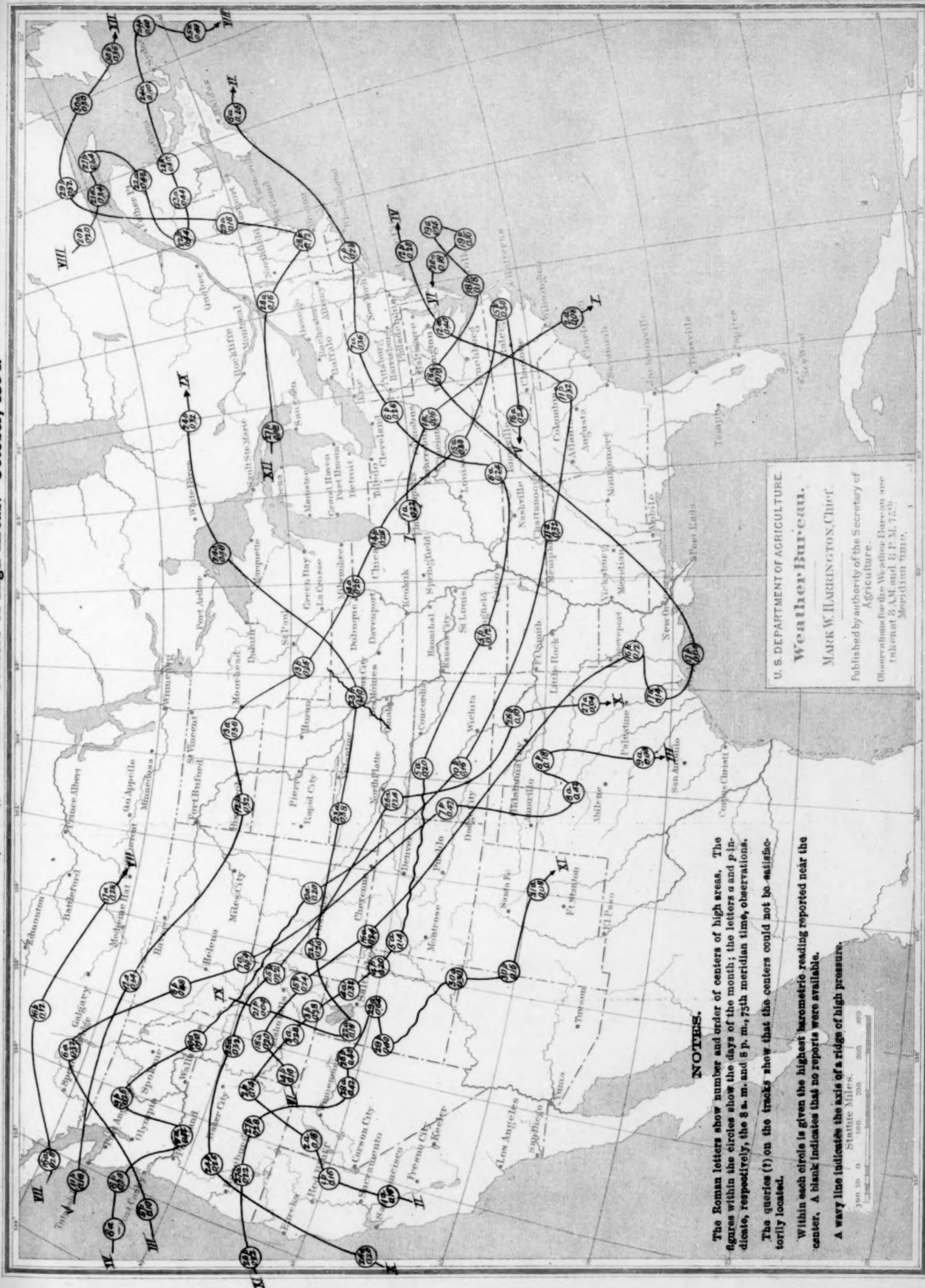






Chart IV. Tracks of Centers of High Areas. October, 1894.



# NOTES.

The Roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters a and p indicate, respectively, the a. m. and p. m., 75th meridian time, observations.

The queries (?) on the tracks show that the centers could not be satisfactorily located.

Within each circle is given the highest barometric reading reported near the center. A blank indicates that no reports were available.

A wavy line indicates the axis of a ridge of high pressure.

0 100 200 300 400

Statute Miles.

0 100 200 300 400

Nautical Miles.

U. S. DEPARTMENT OF AGRICULTURE.

Weather Bureau.

MARK W. HARRINGTON, Chief.

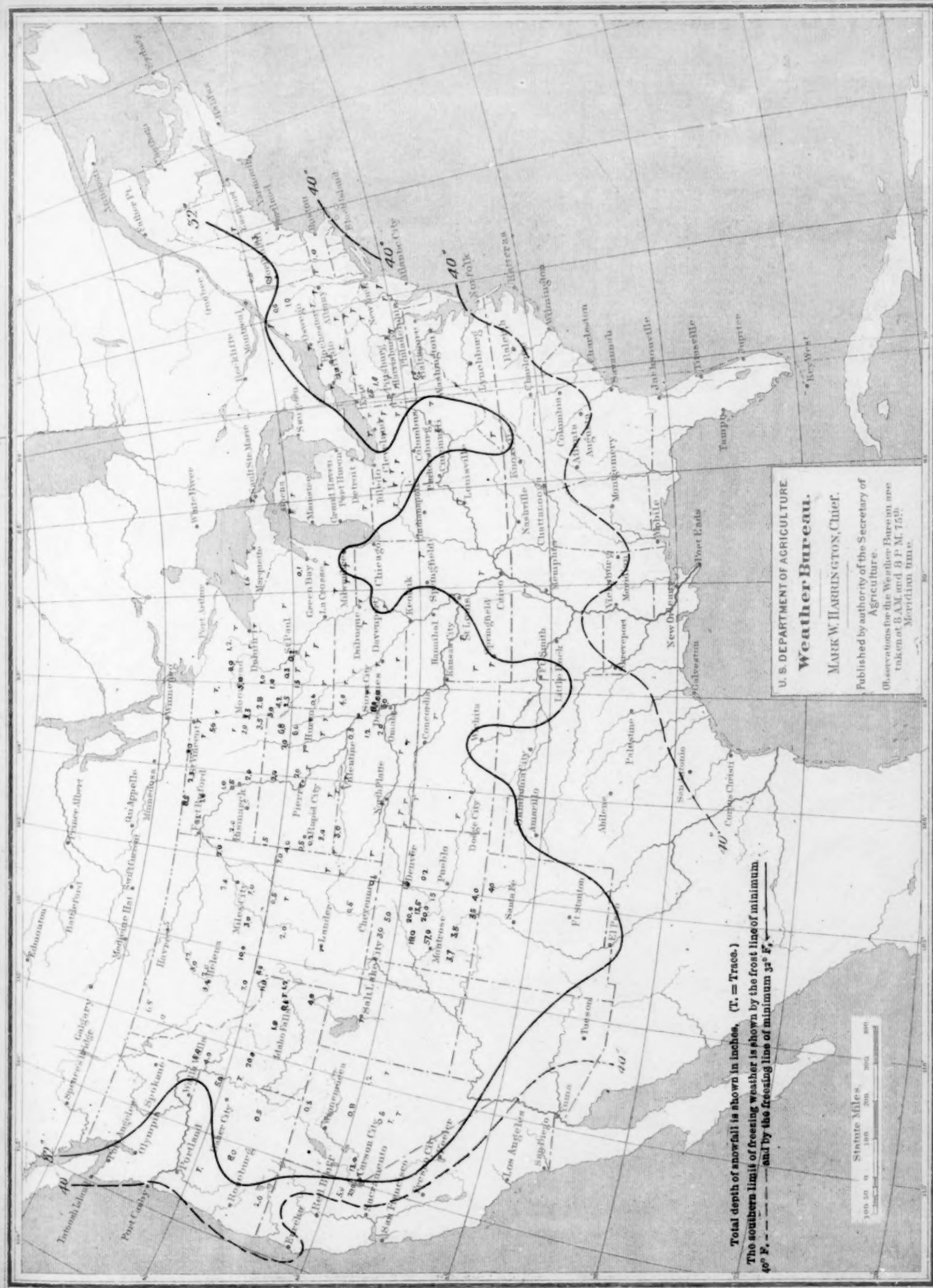
Published by authority of the Secretary of Agriculture.

Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M. 75th Meridian time.





Chart V. Depth of Snowfall (inches) and Limits of Freezing Weather. October, 1894.



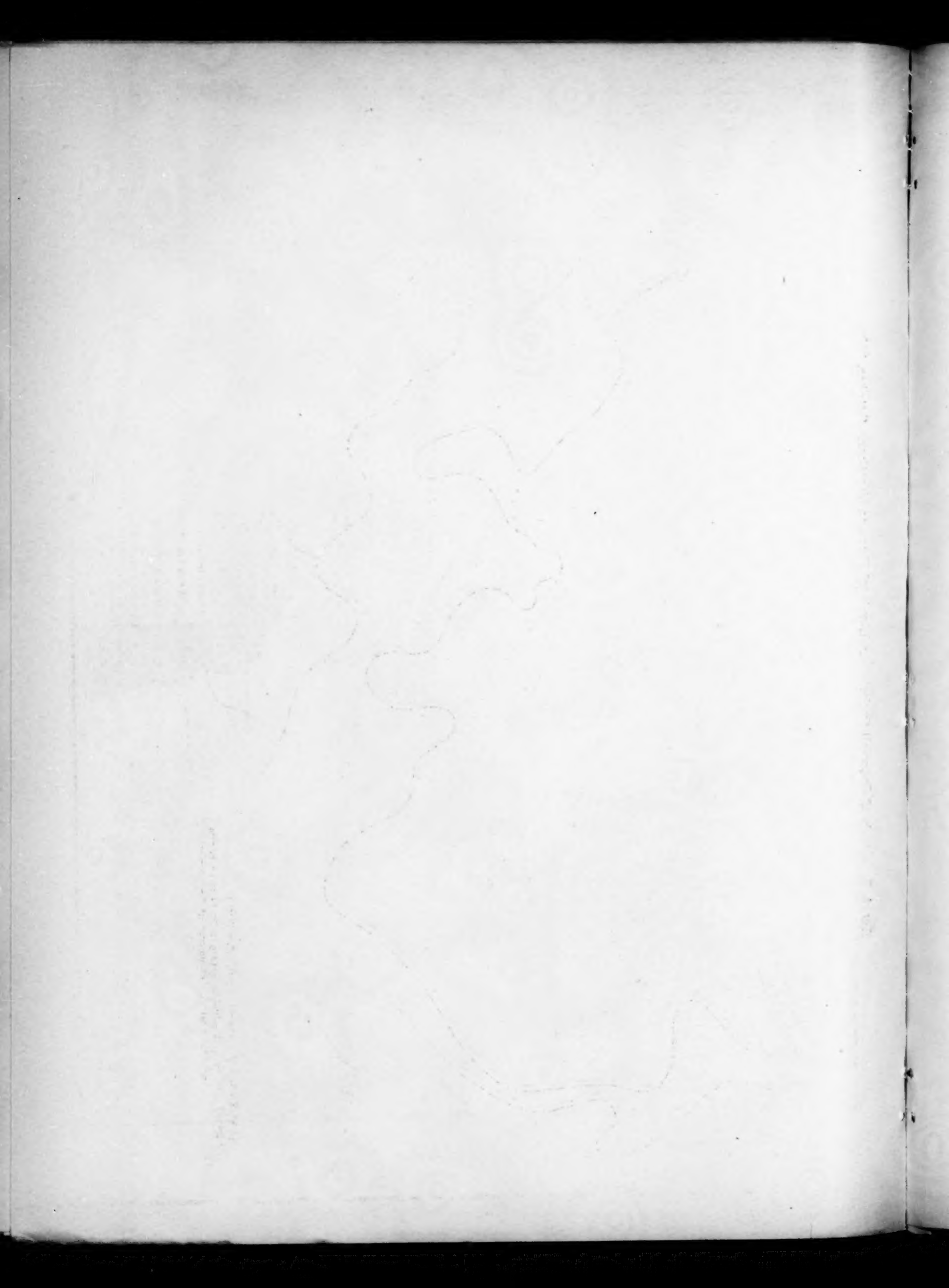
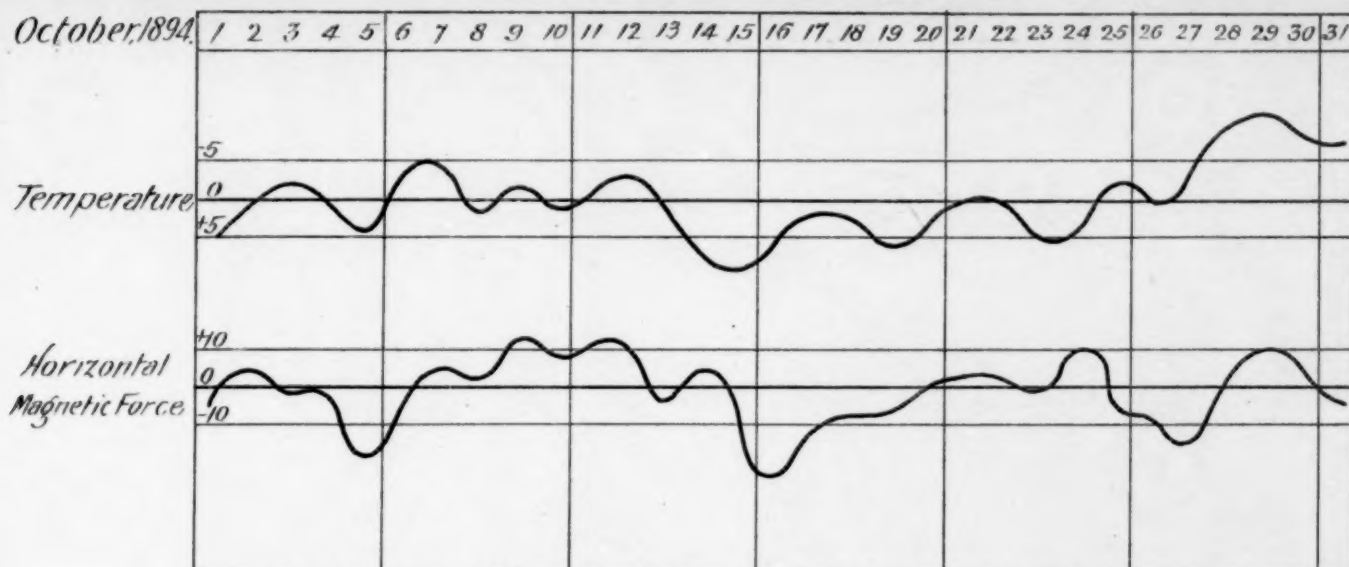


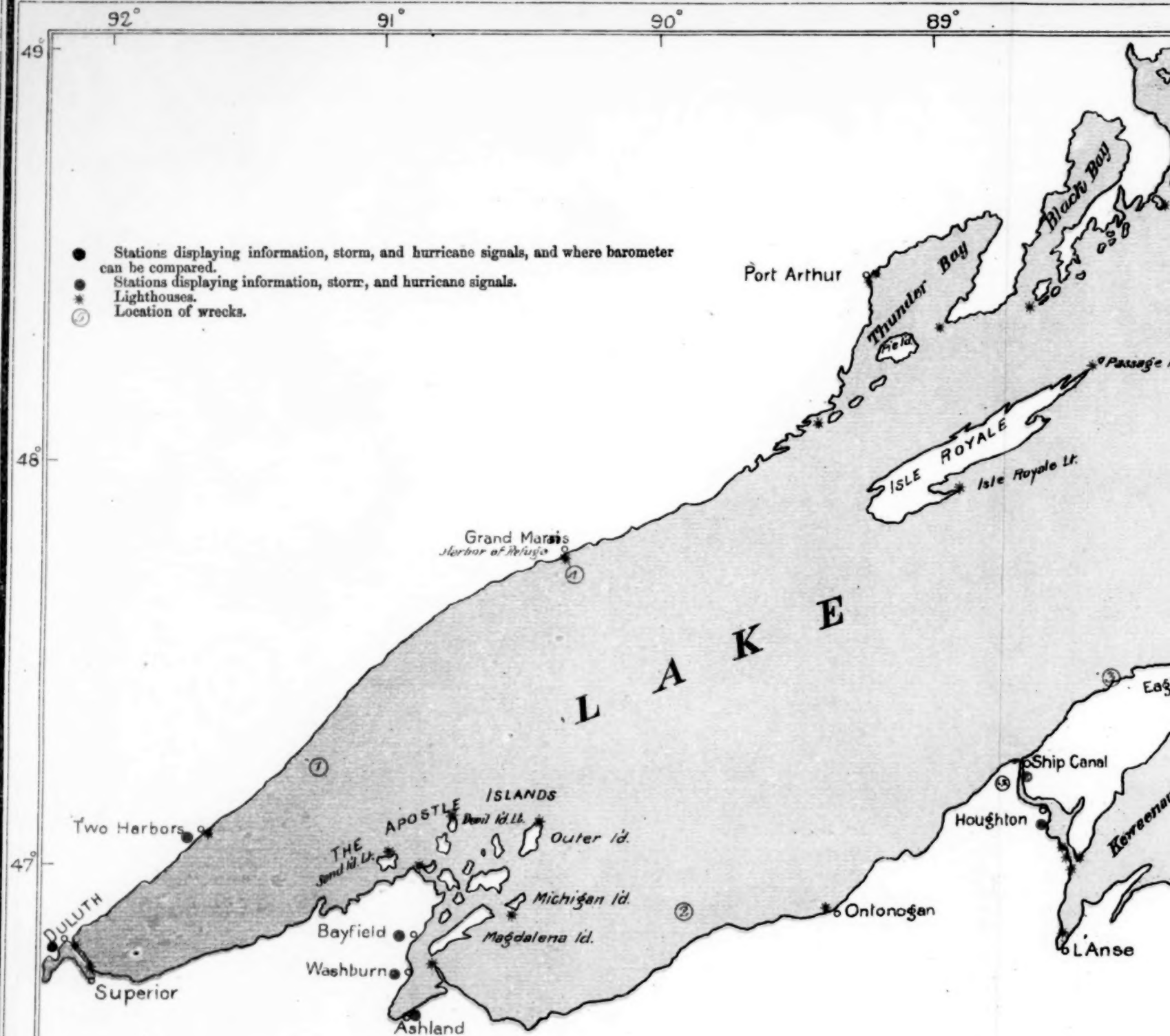


Chart VI. Relative Variations of the Northwest Temperatures and the Horizontal Magnetic Force of Toronto, Washington, and San Antonio.



October 1894.	North West Temperatures.								Horizontal Magnetic Force.						
	Calgary	Williston	Sioux City	Variations.			Mean $\pm 5^\circ$	Toronto	Washington	San Antonio	Variations.			Mean.	
				Calgary	Williston	Sioux Cy.					Toronto.	Washington	San Antonio		
1	44°	42°	58°	+4°	-5°	0°	+5°	33.6	598	3052	-6	-2	+4	-1	
2	40	38	51	0	-9	-7	0	34.5	603	043	+4	+4	+1	+3	
3	37	42	49	-3	-5	-9	-1	33.8	599	033	-4	+1	-2	-2	
4	39	40	52	-1	-7	-6	0	33.5	610	01.6	-7	+13	-8	-1	
5	36	44	61	-4	-3	+3	+4	32.6	572	00.2	-16	-24	-13	-18	
6	33	36	48	-7	-11	-10	-4	34.2	57.6	06.5	0	-19	+8	-4	
7	36	38	42	-4	-9	-16	-5	35.9	57.8	06.9	+17	-16	+9	+3	
8	43	45	49	+3	-2	-9	+2	34.2	58.4	08.6	0	-9	+15	+2	
9	36	44	51	-10	-3	-7	-2	35.2	59.2	13.0	+10	0	+30	+13	
10	42	46	55	-4	-1	-3	+2	35.2	59.5	10.0	0	+4	+20	+8	
11	39	44	56	-7	-3	-2	-1	35.6	59.5	08.6	+14	+5	+15	+11	
12	36	43	49	-10	-4	-9	-3	35.8	59.6	06.4	+16	+7	+8	+10	
13	43	47	51	-3	0	-7	+2	33.5	57.8	04.7	-7	-10	+2	-5	
14	47	50	61	+1	+3	+3	+7	35.2	58.4	07.3	+10	-3	+11	+5	
15	50	53	61	+4	+6	+3	+9	33.3	57.2	04.8	-9	-14	+3	-7	
16	40	43	63	-6	-4	+5	+3	30.8	54.9	00.0	-34	-36	-13	-24	
17	36	44	62	-10	-3	+4	+2	33.4	56.3	02.3	-8	-21	-5	-11	
18	32	46	64	-14	-1	+6	+2	33.1	57.3	01.9	-11	-10	-6	-9	
19	35	50	68	-11	+3	+10	+6	34.4	57.6	00.2	+2	-6	-12	-5	
20	36	46	62	-10	-1	+4	+3	34.6	58.5	01.3	+4	+4	-8	0	
21	34	44	59	-12	-3	+1	0	36.3	57.7	01.2	+21	-3	-8	+3	
22	34	45	59	-12	-2	+1	+1	35.0	58.5	00.4	+8	+6	-11	+1	
23	35	54	61	-11	+7	+3	+5	34.5	58.3	02.3	+3	+5	-5	+1	
24	42	49	62	-4	-2	+4	+4	35.5	58.8	05.9	+13	+11	+7	+10	
25	36	45	51	-10	-6	-7	-3	32.8	57.5	02.7	-14	-1	-4	-6	
26	39	46	56	-7	-5	-2	0	33.6	56.7	00.9	-6	-8	-10	-8	
27	34	40	47	-12	-11	-11	-6	32.4	56.0	02.0	-18	-14	-6	-13	
28	31	35	40	-15	-16	-18	-11	35.3	57.9	03.7	+11	+6	0	+6	
29	33	34	37	-13	-17	-21	-12	34.9	58.5	06.4	+7	+13	+9	+10	
30	35	39	43	-11	-12	-15	-8	35.2	57.9	08.0	+10	-8	+14	+5	
31	31	37	47	-15	-14	-11	-8	34.2	56.4	07.6	0	-22	+13	-3	

# U. S. Department of Agri



## INFORMATION, STORM, AND HURRICANE SIGNALS.



By night a red light will indicate easterly winds, and a white light above a red light westerly winds. Hoisting signals for each quadrant is an opinion only, offered as an aid to the public.

The hurricane signal will be displayed to announce the expected approach of tropical hurricanes, and also of those extremely severe and dangerous storms which occasionally move across the Lakes and northern Atlantic coast.



When displayed at stations on the Great Lakes indicates that winds are expected which, in the opinion of the Forecast Official, may prove dangerous to smaller classes of vessels and towns, without reference to any stated velocity—a red pennant easterly winds, a white pennant westerly winds.







# Agriculture, Weather Bureau.





# Wreck and Casualty Chart of

84°

83°

82°

81°

80°

No. 15. Schooner *Mercury* was beached off Twenty-fifth street, Chicago, Ill., May 18, 1894, during heavy northeast gale and became a total loss. No lives lost. Estimated loss on vessel and cargo, \$8,100.

No. 16. Schooner *Rainbow* became water-logged and capsized during heavy northeast gale at the foot of Twelfth street, Chicago, Ill., May 18, 1894, and became a total loss. No lives lost. The captain and 2 men floated ashore on a hatch. The other 4 men were rescued by the tug *Spencer*. Estimated loss on vessel and cargo, \$7,000.

No. 17. Schooner *Moses Gage* drove ashore during a heavy northeast gale at Michigan City, Ind., and became a total loss, May 18, 1894. The crew was rescued by the life-saving crew at Michigan City. Estimated loss on vessel and cargo, \$4,000.

No. 18. Schooner *Mineral State* was scuttled while lying at the dock at Elk Rapids, Mich., during heavy northeast gale of May 18, 1894. Wind velocity 60 miles per hour. No lives lost. Estimated loss on vessel, \$300. Released.

No. 19. Schooner *Myrtle Camp* drove ashore during heavy northeast gale, 15 miles north of Menominee, Mich., May 18, 1894, and became a total loss. No lives lost. Estimated loss on vessel, \$1,500.

No. 20. Schooner *Emily Cooper* drove ashore near Manitowoc, Wis., during a heavy northeast gale, May 18, 1894. No lives lost. Estimated damage to vessel, \$1,200.

No. 21. Schooner *Sizer* drove ashore during a heavy northeast gale, 15 miles north of Menominee, Mich., May 18, 1894. Estimated damage to vessel, \$——. Released.

No. 22. Steamer *E. S. Tice* was beached during heavy northeast gale 3 miles northeast of Green Bay, Wis., May 18, 1894. Released.

No. 23. Schooner *Winslow* became water-logged through stress of weather and was driven ashore during heavy northeast gale at Menominee, Mich., May 18, 1894. No lives lost. Released.

No. 24. Steamer *Alleghany* was stranded through stress of weather on Grassy Island, Green Bay, May 18, 1894. No lives lost. Estimated damage to vessel, \$1,200. Released.

No. 25. Steamer *Hudson*, during a heavy northeast gale and snow, had her forward cabin washed away and steering gear damaged by heavy seas, 60 miles northeast of Chicago, Ill., May 18, 1894. Estimated damage to vessel and cargo, \$2,000.

No. 26. Schooner *T. Y. Avery* lost her deckload of lumber in Chicago Harbor during a heavy northeast gale and tremendous sea, May 18, 1894. Estimated loss on vessel and cargo, \$625.

No. 27. Schooner *Magnolia*, during a heavy northeast gale, lost her canvas and stranded 8 miles southeast of Chicago, Ill., May 18, 1894. No lives lost. Estimated loss on vessel, \$400. Released.

No. 28. Schooner *City of Grand Rapids*, in a northeast gale of 70 miles an hour and heavy sea off Chicago, Ill., May 18, 1894, damaged by collision. Estimated loss on vessel and cargo, \$700.

No. 29. Schooner *M. A. Gregory* parted her moorings near Chicago, Ill., during a heavy northeast gale and heavy sea, May 18, 1894. Estimated loss on vessel and cargo, \$185.

No. 30. Schooner *Lem Ellsworth*, heavily freighted with block stone from Lake Superior to Chicago, passed through the straits on May 15, 1894, and was supposed to have foundered in the heavy gale of May 18, 1894. The schooner's yawl was found about a week after the storm, 2 miles off Kenosha, Wis. Nothing has since been heard of this vessel. Her entire crew, consisting of 7 lives, was lost with the vessel. Estimated loss on vessel and cargo, \$10,000.

No. 31. Steamer *Brittanic* grounded on White Shoals during thick weather and strong current from the north, running 10 miles per hour, and some sea, May 30, 1894. Estimated damage to vessel, \$7,760. Released.

No. 32. Schooner *A. P. Grover* stranded during thick, smoky weather at South Manitou Island, August 6, 1894. Was released some time later. Estimated damage to vessel, \$3,000.

No. 33. Schooner *Magdalena* sprung a leak and foundered during a north gale, August 9, 1894. No lives were lost. Estimated loss on vessel and cargo, \$400.

No. 34. Schooner *Belle Laurie*, during high seas and heavy gale, foundered in Garrett Bay, August 10, 1894. No lives lost. Estimated damage to vessel and cargo, \$300.

No. 35. Schooner *James G. Blaine* stranded during thick smoky weather and some sea on northwest end of South Fox Island, August 27, 1894. Estimated damage to vessel, \$2,500. Released.

No. 36. Steamer *Griffin* stranded on Dead Mans Point during thick, smoky weather, August 28, 1894. Damage to vessel, \$3,200. Released.

No. 37. Steamer *Florida* stranded during dense smoke on Pyramid Point, August 27, 1894. Estimated damage to vessel and cargo, \$5,100. Released.

No. 38. Steamer *Robert Holland* stranded during dense fog and smoke on Sleeping Bear Point, September 1, 1894. Estimated damage to vessel, \$5,000. Released.

No. 39. Schooner *Fannie Neil* stranded during thick, smoky weather on Sleeping Bear Point, September 1, 1894. Estimated damage to vessel, \$3,000. Released.

No. 40. Schooner *S. M. Stephenson* stranded on Sleeping Bear Point during thick, smoky weather, September 1, 1894. Damages nominal.

No. 41. Schooner *Arctic* stranded during dense fog and smoke 2 miles south of Antrim Shoal, September 3, 1894. Estimated damage to vessel, \$500.

No. 42. Steamer *City of Charlevoix* stranded 3 miles north of Charlevoix, during thick, smoky weather, September 7, 1894. Damage to vessel, \$2,500. Released.

No. 43. Schooner *Laura Miller* stranded north of Holland, Mich., during a 35-mile gale of wind on a dark night, September 7, 1894. Damage to vessel, \$300.

No. 44. Schooner *Baltic* stranded on reef near South Point, Milwaukee, during thick weather, September 10, 1894. Estimated damage to vessel, \$4,260. Released.

No. 45. Schooner *Grace M. Filer* stranded 3 miles inside of Grand Traverse Point in a gale of wind and smoky weather, September 10, 1894. Estimated damage to vessel, \$700. Released.

No. 46. Schooner *Jennie Mullen* stranded 1 mile south of Charlevoix piers during a heavy gale, September 15, 1894. Estimated damage to vessel and cargo, \$2,050. Released.

No. 47. Schooner *Agnes L. Potter* struck the south pier at Grand Haven, Mich., September 23, 1894, during a 60-mile gale and heavy sea. Estimated damage to vessel, \$100.

No. 48. Schooner *William Home*, in tow of the steamer *F. R. Buell*, sprung a leak during a heavy southeast gale and released the towline from the steamer and her consort and endeavored to reach shelter, but foundered 3 miles off Seul Choix Point, and became a total loss, September 26, 1894. The crew of 7 took to the lifeboat and endeavored to reach shore, but the boat was capsized in the breakers and 6 lives were lost. Estimated loss on vessel and cargo, \$10,000.

No. 49. Schooner *L. May Guthrie* stranded on Fisherman Shoals during a high sea and gale of wind and became a total loss, September 26, 1894. No lives lost. Estimated loss on vessel and cargo, \$2,700.

No. 50. Schooner *Nelson Bloom* was struck by a heavy gale between Beaver and Poverty Islands, which carried away her spars, October 13, 1894. Estimated damage to vessel, \$1,200.

No. 51. Schooner *A. J. Mowrey* was dismasted in a heavy northwest gale and heavy sea off Port Washington, October 13, 1894. Vessel reached port in safety. Estimated damage to vessel, \$800.

No. 52. Schooner *Alca Bradley* foundered and became a total loss in a heavy northwest gale at the south end of North Manitou Island, October 13, 1894. The crew of 6 men and 1 woman were rescued by the life savers of North Manitou Island. Estimated loss on vessel and cargo, \$40,000.

No. 53. Schooner *May Cornell* stranded on reef 3 miles north of Grande Pointe during a strong southeast gale and rain, October 13, 1894, and became a total loss. No lives lost. Estimated value of vessel and cargo, \$370.

No. 54. Schooner *C. L. Fisk*, while at anchor, was driven ashore in a 40-mile gale and became a total loss, October 15, 1894, at the Las Pier, Oceana County, Mich. No lives lost. Estimated loss on vessel, \$1,300.

No. 55. Scow *St. Ignace*, loaded with brick, capsized in mid-lake and became a total loss, November 10, 1894, during a heavy northwest gale. One life lost. Estimated loss on vessel and cargo, \$4,000.

No. 56. Steamer *W. L. Wetmore*, with schooner *Brunette* in tow, stranded during a heavy southerly gale and high sea, accompanied by snow, 2 miles off Cleveland, Wis., November 12, 1894. Crew rescued with difficulty by the Two Rivers life-saving crew. Estimated damage to vessel and cargo, \$13,500. Released.

No. 57. Schooner *Brunette*, in tow of the steamer *W. L. Wetmore*, stranded 2 miles off Cleveland, Wis., during a heavy southerly gale, accompanied by snow and high seas, November 12, 1894. No lives lost. Estimated damage to vessel and cargo, \$6,000. Released.

No. 58. Steamer *Monteagle* stranded on Morgans Reef during snowstorm, November 13, 1894. Estimated damage to vessel, \$15,000. Released.

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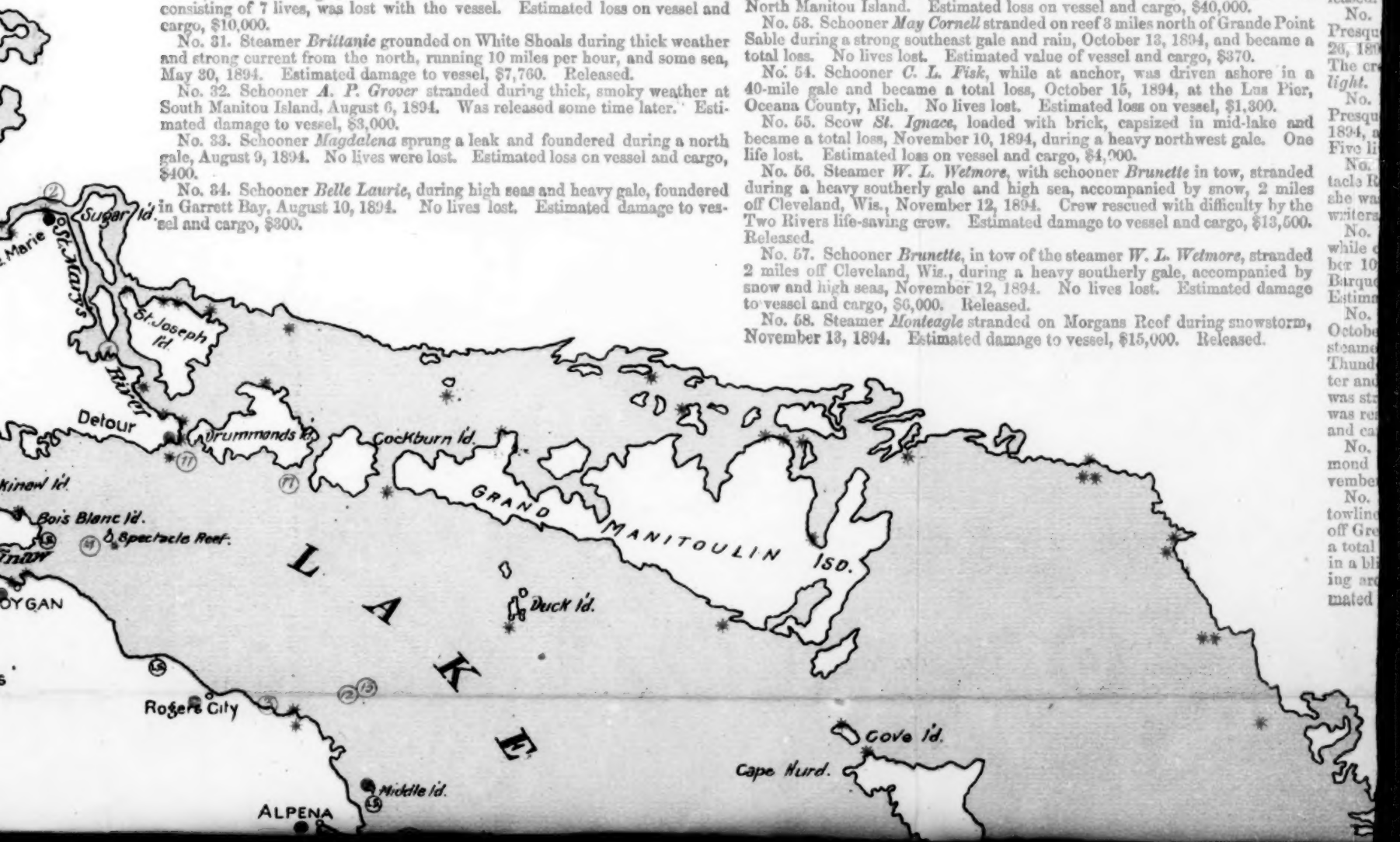
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No. 36. Steamer *Griffin* stranded on Dead Mans Point during thick, smoky weather, August 28, 1894. Damage to vessel, \$3,200. Released.

No. 37. Steamer *Florida* stranded during dense smoke on Pyramid Point, August 27, 1894. Estimated damage to vessel and cargo, \$5,100. Released.

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No. 44. Schooner *Baltic* stranded on reef near South Point, Milwaukee, during thick weather, September 10, 1894. Estimated damage to vessel, \$4,260. Released.

No. 45. Schooner *Grace M. Filer* stranded 3 miles inside of Grand Traverse Point in a gale of wind and smoky weather, September 10, 1894. Estimated damage to vessel, \$700. Released.

No. 46. Schooner *Jennie Mullen* stranded 1 mile south of Charlevoix piers during a heavy gale, September 15, 1894. Estimated damage to vessel and cargo, \$2,050. Released.

No. 47. Schooner *Agnes L. Potter* struck the south pier at Grand Haven, Mich., September 23, 1894, during a 60-mile gale and heavy sea. Estimated damage to vessel, \$100.

No. 48. Schooner *William Home*, in tow of the steamer *F. R. Duell*, sprung a leak during a heavy southeast gale and released the towline from the steamer and her consort and endeavored to reach shelter, but foundered 3 miles off Seal Choix Point, and became a total loss, September 26, 1894. The crew of 7 took to the lifeboat and endeavored to reach shore, but the boat was capsized in the breakers and 6 lives were lost. Estimated loss on vessel and cargo, \$10,000.

No. 49. Schooner *L. May Guthrie* stranded on Fisherman Shoals during a high sea and gale of wind and became a total loss, September 26, 1894. No lives lost. Estimated loss on vessel and cargo, \$2,700.

No. 50. Schooner *Nelson Bloom* was struck by a heavy gale between Beaver and Poverty Islands, which carried away her spars, October 13, 1894. Estimated damage to vessel, \$1,200.

No. 51. Schooner *A. J. Mowrey* was dismantled in a heavy northwest gale and heavy sea off Port Washington, October 13, 1894. Vessel reached port in safety. Estimated damage to vessel, \$800.

No. 52. Schooner *Alex Bradley* foundered and became a total loss in a heavy northwest gale at the south end of North Manitou Island, October 13, 1894. The crew of 6 men and 1 woman were rescued by the life savers of North Manitou Island. Estimated loss on vessel and cargo, \$40,000.

No. 53. Schooner *May Cornell* stranded on reef 3 miles north of Grande Point Sable during a strong southeast gale and rain, October 13, 1894, and became a total loss. No lives lost. Estimated value of vessel and cargo, \$370.

No. 54. Schooner *C. L. Fisk*, while at anchor, was driven ashore in a 40-mile gale and became a total loss, October 15, 1894, at the Las Pier, Oceana County, Mich. No lives lost. Estimated loss on vessel, \$1,300.

No. 55. Scow *St. Ignace*, loaded with brick, capsized in mid-lake and became a total loss, November 10, 1894, during a heavy northwest gale. One life lost. Estimated loss on vessel and cargo, \$4,000.

No. 56. Steamer *W. L. Wetmore*, with schooner *Brunette* in tow, stranded during a heavy southerly gale and high sea, accompanied by snow, 2 miles off Cleveland, Wis., November 12, 1894. Crew rescued with difficulty by the Two Rivers life-saving crew. Estimated damage to vessel and cargo, \$13,500. Released.

No. 57. Schooner *Brunette*, in tow of the steamer *W. L. Wetmore*, stranded 2 miles off Cleveland, Wis., during a heavy southerly gale, accompanied by snow and high seas, November 12, 1894. No lives lost. Estimated damage to vessel and cargo, \$6,000. Released.

No. 58. Steamer *Monteagle* stranded on Morgans Reef during snowstorm, November 13, 1894. Estimated damage to vessel, \$15,000. Released.

No. 59. Schooner *high sea* 1 mile north of vessel, \$700.

No. 60. Steamer *in a storm and* Released.

No. 61. Schooner *gale at Ludington* much difficulty by \$3,000. Released.

No. 62. Schooner *west gale, Novem* were lost. Estim

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No. 2. Steamer *sion*, May 5, 1894.

No. 3. Schooner *Fisher, Mich., M* became a total lo

No. 4. Schooner *heavy gale, strand* a total loss. The

No. 5. Schooner *Bay, May 20, 189* on vessel, \$200.

No. 6. Steamer *gale and thick w* Estimated loss on

No. 7. Steamer *during thick fog,* \$11,000. Release

No. 8. Steamer *south point of Ma* sel, \$3,500. Rele

No. 9. Schooner *Fisherman Bay an* Estimated loss on

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No. 59. Schooner *Julia* stranded during a gale of 50 miles per hour and high sea 1 mile north of Cedar River, November 14, 1894. Estimated damage to vessel, \$700.

No. 60. Steamer *David Wallace* stranded on Sissaway Point, Squaw Island, in a storm and heavy sea, November, 14, 1894. Damage to vessel, \$4,500. Released.

No. 61. Schooner *D. S. Austin* drove ashore during a heavy northwest gale at Ludington, Mich., November 15, 1894. The crew was rescued with much difficulty by the Ludington life-saving crew. Estimated loss on vessel, \$1,000. Released.

No. 62. Schooner *Antelope* was capsized and foundered during heavy south-east gale, November 15, 1894. The entire crew of 3 men and 1 passenger were lost. Estimated value of vessel, \$600.

## LAKE HURON.

No. 1. Steamer *W. H. Barnum*, encountering heavy weather on Lake Michigan, sprung a leak and, meeting heavy ice fields in the Straits of Mackinac, was taken in tow by a tug and endeavored to reach shelter. The water rising rapidly, the tug left the steamer to obtain pumps, and the steamer undered off Freedom, Mich., and became a total loss, April 3, 1894. No lives were lost. Estimated loss on vessel and cargo, \$52,000.

No. 2. Steamer *Charles Hebard* during a dense fog was damaged by collision, May 5, 1894. Estimated damage to vessel, \$4,500.

No. 3. Schooner *American Union* drove ashore during heavy gale at Asher, Mich., May 7, 1894, and after unsuccessful efforts to release her she became a total loss in the gale of May 18, 1894. Estimated loss on vessel, \$1,000.

No. 4. Schooner *Wm. Shupe* became water-logged and overborne in a heavy gale, stranded 3 miles above Gratiot Light, May 19, 1894, and became a total loss. The crew were rescued in safety, but in the heroic efforts made rescuing the crew, 4 persons lost their lives. Estimated loss on vessel and cargo, \$5,500.

No. 5. Schooner *H. D. Stockman* foundered in a heavy gale in Saginaw Bay, May 20, 1894, and became a total loss. No lives lost. Estimated loss on vessel, \$200.

No. 6. Steamer *Loretta* sprung a leak and was beached during a heavy ice and thick weather at the mouth of the Au Sable River, May 20, 1894. Estimated loss on vessel and cargo, \$6,000. Released.

No. 7. Steamer *Escanaba* stranded half mile from Grind Stone City, Mich., during thick fog, May 24, 1894. Estimated damage to vessel and cargo, \$1,000. Released.

No. 8. Steamer *M. T. Green*, during thick and smoky weather, stranded on north point of Mackinac Island, August 26, 1894. Estimated damage to vessel, \$3,500. Released.

No. 9. Schooner *Evening Star* was stranded during strong north gale in Sherman Bay and became a total loss, September 12, 1894. No lives lost. Estimated loss on vessel, \$—.

No. 10. Canadian steamer *Enterprise* stranded in a heavy southeast gale and thick weather on north point of Thunder Bay Reef, September 13, 1894. Lives were lost. Estimated loss on vessel and cargo, \$34,000. This vessel was afterwards released and rebuilt as an American bottom.

No. 11. Steamer *S. P. Ely* dragged ashore on Drummond Island during heavy gale, September 13, 1894. Estimated damage to vessel, \$1,000. Released.

No. 12. Steamer *Ohio* collided with the schooner *Ironton*, 15 miles off Presque Isle, during the early morning, with moderate south wind, September 18, 1894, and sank thirty minutes after being struck, and became a total loss. The crew of 16 took to the lifeboats and was rescued by the schooner *Moonlight*. Estimated loss on vessel and cargo, \$40,000.

No. 13. Schooner *Ironton* collided with the steamer *Ohio*, 15 miles off Presque Isle, during early morning, with moderate south wind, September 25, 1894, and became a total loss. The vessel sank one hour after being struck. Lives were lost. Estimated loss on vessel, \$20,000.

No. 14. Steamer *Neosha*, ore laden, Ashland to Chicago, stranded on Specie Reef during the afternoon of September 29, 1894. Before being released she was badly damaged by gales and heavy seas and abandoned to the undertakers, who afterwards released her. Estimated damage to vessel, \$108,000.

No. 15. Schooner *John Wesley*, laden with lumber, became water-logged while crossing Saginaw Bay and capsized during heavy northwest gale, October 10, 1894, and abandoned. The crew was rescued by the Pointe aux Lacs life-saving crew. The vessel was afterwards recovered and repaired. Estimated damage to vessel and cargo, \$5,000.

No. 16. Steamer *D. M. Wilson*, while crossing Saginaw Bay, sprung a leak October 27, 1894, endeavored to reach shelter, and was taken in tow by the tugs *Samuel Mitchell* and *Hudson*, but foundered 2 miles northeast of Thunder Bay Island and became a total loss. The wreck lay in 40 feet of water and broke up during the gales of November 10, 1894, and her wreckage strewn along the shore from Au Sable River to East Tawas. The crew rescued by the Thunder Bay life-saving crew. Estimated loss on vessel and cargo, \$37,500.

No. 17. Steamer *Wawatam* stranded on south end of Tug Shoal, Drummond Island, on a dark night, with a heavy northeast gale and snowing, November 10, 1894. Estimated damage to vessel and cargo, \$7,750.

No. 18. Schooner *John Shaw*, in tow of steamer *John F. Eddy*, parted her line in a heavy southwest gale and snowstorm, sprung a leak, and foundered Greenbush, Mich., during early morning, November 13, 1894, and became a total loss. Her crew, being unable to keep her afloat, abandoned her, and a blinding snowstorm lost sight of the steamer and consort, and after float- around some time was rescued by the steamer *H. E. Runnels*. Estimated loss on vessel and cargo, \$43,310.

## LAKE ST. CLAIR AND DETROIT RIVER.

No. 1. Steamer *Burlington* caught fire and was beached in the Detroit River at Chappells and became a total loss, April 17, 1894. No lives lost. Vessel was afterwards released by order of the Dominion government late in December. Loss on vessel and cargo, \$10,000.

No. 2. The steam yacht *Ellen M.* left the St. Clair Flats at 1 p. m., June 24, 1894, bound for Detroit. After going out several miles in the lake, she was struck by a sudden thunder squall and heavy sea, causing her to founder, carrying down her owner and 2 passengers; 2 other passengers were rescued by the steamer *J. H. Pauly*. The yacht was afterwards raised.

No. 3. Dredge *Genl. Meade*, lying just below the St. Clair Flats Canal, was overborne by a sudden thunder squall and heavy sea and foundered, June 24, 1894. One life lost. Dredge was afterwards raised. Damages nominal.

No. 4. Schooner *Glad Tidings* collided during early morning of July 29, 1894, with steamer *Pathfinder* and sank in the vicinity of Fighting Island, carrying down with her the entire crew of 4 persons. Estimated value of vessel and cargo, \$3,000.

## LAKE ERIE.

No. 1. Schooner *H. D. Root*, during a squall of 40 miles per hour, stranded on Beach Point Reef, South Bass Islands, April 3, 1894, and sustained damage to the amount of \$1,000. Released.

No. 2. Steamer *Norwalk* stranded on North Harbor Reef on August 23, 1894, during smoky weather. Damage to vessel and cargo, \$7,000. Released.

No. 3. Steamer *Nahant* grounded during thick, smoky weather 1½ miles east of Pointe aux Pelee, September 1, 1894. After jettisoning some cargo, she was released. Estimated damage to vessel, \$450; cargo, \$100; total, \$550.

No. 4. Schooner *Cok. Cook*, formerly named the *Augusta*, which, in a collision with the steamer *Lady Elgin* on Lake Michigan, caused the latter to sink, with the loss of 300 lives, on September 8, 1860, left Kelleys Island with a cargo of stone in tow of the tug *Sprinkle* bound for Cleveland, Ohio, sprung a leak and was driven on the beach near Lorain, Ohio, during a heavy southerly gale, and became a total loss September 23, 1894. The crew was rescued by the ice boat *Andrew Walton*, in tow of the *Sprinkle*, and brought safely to shore. Loss on vessel, \$2,500; cargo, \$200; total, \$2,700.

No. 5. Steamer *Samuel Mather* ran into the pier while entering Ashtabula Harbor, October 5, 1894, during a 30-mile gale from the southwest, being damaged to the amount of \$1,200.

No. 6. Schooner *Tasmania*, in tow of the steamer *Australasia*, laden with ore, was dropped off at Cleveland and, trying to enter the harbor under sail, was driven on the beach during a heavy northwest gale, October 11, 1894. The crew and 2 daughters of the captain were rescued, with much difficulty, by the life-saving crew. Estimated loss on vessel, \$5,000. Released.

No. 7. Steamer *C. W. Chamberlain* encountered a heavy sea 40 miles from Long Point, October 11, 1894, and was badly stove in forward and lost her rudder before being picked up by tugs and towed to Buffalo. Estimated damage to vessel, \$800; cargo, \$1,000; total, \$1,800.

No. 8. Barge 132 was driven ashore 1 mile east of Ashtabula Harbor on rocky bottom during very heavy gale from the northwest, accompanied by snow, October 14, 1894. The anchor of the barge was dropped, but failed to hold on the rocky bottom. She was scuttled and sank and sustained damage to the amount of \$10,000, and cargo of iron ore to the amount of \$3,300; total, \$13,300. Released.

No. 9. Steamer *Alva* ran aground on Seneca Shoal about 7 miles from Buffalo, N. Y., during foggy weather, October 20, 1894, sustaining damage to the amount of \$1,500.

No. 10. Steamer *George T. Hope*, during a 60-mile gale, accompanied by heavy sea, while 20 miles off Conneaut, Ohio, November 3, 1894, was strained and sustained damage to the amount of \$2,980.

No. 11. Steamer *Seattle*, during a southeast gale, ran into Rondeau Harbor for shelter, November 2, 1894, but, the wind shifting to the southwest, she was torn from her dock by the tremendous current on November 3, 1894, and thrown on the beach just east of the harbor. This is a striking example of the currents of the Great Lakes, which, during severe storms, run with great force and test the strongest lines of vessels tied to docks, which, during ordinary weather, are perfectly safe. The vessel was released several days later by a wrecking expedition, which had great difficulty in doing so. Estimated damage to vessel, \$5,000; cargo, \$5,000; total, \$10,000. No lives were lost.

No. 12. Schooner *Belle Hanscomb* encountered heavy gale from the southwest during night of November 2 and morning of November 3, 1894, while near Long Point. Vessel began leaking and had canvas blown away, but managed to get under shelter of the point and let go both anchors, but the wind was so strong that the boat dragged into 22 fathoms, where the seas broke over her so heavily that the crew could not remain at the pump and there was imminent danger of foundering. A signal of distress was noticed by the steamer *P. J. Ralph*, which, after considerable trouble, managed to get a line to the schooner, which, slipping her anchors, was towed to Buffalo, N. Y. No lives were lost. Loss on vessel, \$1,000; cargo, \$184; total, \$1,184.

No. 13. Steamer *Oscar F. Flint* stranded during a blinding snowstorm and southwest gale, November 13, 1894, on Bar Point Shoal, sustaining damage to the amount of \$1,000. Released, repaired, and placed in winter quarters.

No. 14. Schooner *Senator Blood* was driven on the beach near Lorain, Ohio, during a heavy northwest gale, November 24, 1894. At the time of the disaster the weather was very cold and the entire crew were compelled to work the pumps without having the shelter of oil-skin coats, and before being rescued they were nearly famished, as they dare not leave the pumps long enough to procure food, and were covered with frozen spray. The schooner was finally rescued by the fishing tug *Susie Bard* and taken to Lorain, Ohio. No lives lost. Damage to vessel, \$—.

No. 15. Steamer *Colgate Hoyt*, bound from Duluth to Buffalo with a cargo of wheat, pulled under Long Point during a heavy northwest gale and snow squall and grounded, November 25, 1894. Before being released, cargo to the amount of \$5,000 was jettisoned. Damage to vessel nominal.

## LAKE ONTARIO.

No. 1. Schooner *Glad Tidings* ran ashore on Bakers Point, May 10, 1894. No lives lost. Estimated loss on vessel, \$500.

No. 2. Schooner *Hartford* foundered in Mexico Bay during high northwest gale, October 11, 1894, and became a total loss. Seven lives were lost. The captain, wife, and baby, and 4 of the crew were supposed to have gone down.

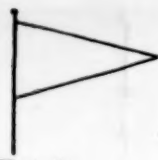
By night a red light will indicate easterly winds, and a white light above a red light westerly winds. Hoisting signals for each quadrant is an only, offered as an aid to the public.

The hurricane signal will be displayed to announce the expected approach of tropical hurricanes, and also of those extremely severe and dangerous storms which occasionally move across the Lakes and northern Atlantic coast.



Easterly.

When displayed at stations on the Great Lakes indicates that winds are expected which, in the opinion of the Forecast Official, may prove dangerous to smaller classes of vessels and towns, without reference to any stated velocity—a red pennant easterly winds, a white pennant westerly winds.



Westerly.

American vessel masters are authorized to telegraph, at Government expense, from any American port on the Great Lakes, where there is no regular Weather Bureau station, asking for information as to the weather conditions. From ports on Lakes Superior, Michigan, or Huron the messages will be addressed to "Weather, Chicago," and on Lakes Erie and Ontario the messages will be addressed "Weather, Buffalo."

The following information relative to special display stations is furnished for the benefit of the public:

The display stations located at Thunder Bay and Middle Islands are connected by telephone with the Weather Bureau office at Alpena, Mich., and the lines may be used by vessel masters desiring to report by telegraph or for obtaining prompt assistance in case of accident. Telegrams will be promptly forwarded by the Observer, Alpena, Mich., when forwarded over these lines.

The display station at Pointe aux Barques is connected by telephone to the central telephone office, Huron City, Mich. The station at Grande Pointe is connected by telephone with Ludington, Mich. The stations at Pointe aux Barques, Thunder Bay Island, Middle Island, and Grande Pointe are located in the life-saving stations at these points.

## REPORT OF WRECKS AND CASUALTIES OCCASIONED BY FOUNDERINGS, GALES OF WIND, FOGS, SMOKE, AND GENERAL STORMY WEATHER CONDITIONS DURING THE SEASON OF 1894.

This report gives in detail the number of casualties occurring on Lakes Superior, Michigan, Huron, Erie, and Ontario, and the connecting rivers during the season of 1894, and includes besides the record of total loss of 44 vessels and cargoes, involving a loss of \$643,243, the partial loss on 68 vessels and cargoes to the amount of \$349,544, and the sacrifice of 68 lives. In this record of 68 lives lost, 3 were lost by being washed overboard, and 1 through collision; the others were sacrificed at the time of the wrecking of the vessels.

The dense smoke from the forest fires during the summer season was the occasion of several expensive strandings in Lakes Michigan, Superior, and Huron.

The most notable storm of the season was that of May 18, when 26 vessels were wrecked or badly damaged. Fourteen of these vessels were total losses, while 12 were partial, the estimated loss being \$88,960, with 26 lives. Twenty-five of these casualties occurred on Lake Michigan, and 1 on Lake Huron; the latter happened during the early morning of May 19, but was the result of the storm of the 18th.

The most serious loss occurred in Chicago Harbor, where 10 vessels foundered or stranded and 8 lives were lost. The estimated loss on the vessels, \$50,760.

The following table summarises the total and partial losses in vessels, property, and lives:

Lake.	Vessels.	No. of total losses.	Estimated value.	No. of partial losses.	Estimated value.	Total of estimated losses.	No. of lives.
Superior .....	7	4	\$150,000	3	\$15,000	\$165,000	2
St. Marys River .....	3	1	12,000	1	8,000	20,000	3
Michigan .....	62	25	235,727	37	93,180	328,907	49
Huron .....	18	8	208,510	10	131,850	339,360	9
St. Clair and Detroit River .....	4	2	13,000	2	.....	13,000	8
Erie .....	15	1	2,700	14	51,514	54,214	1
Ontario .....	4	3	31,300	1	500	31,800	7
Totals .....	112	44	643,243	68	349,544	992,787	68

The losses of 1894 show a saving of 47 per cent on vessel property and 28 per cent on lives over 1893.

The following is a detailed account of each casualty, the number referring to the location on the chart:

### LAKE SUPERIOR.

No. 1. Steamer *St. Magnus* struck on the rocks during dense fog, about 60 miles northeast of Duluth, June 13, 1894. Hull badly damaged; cargo saved.

No. 2. Steamer *Roanoke* caught fire during thick, smoky weather, and became a total loss, 48 miles off Ontonagon, August 7, 1894. Crew rescued by steamer *Geo. Spencer*, after floating around some time in the lifeboat. Estimated loss on vessel and cargo, \$54,800.

No. 3. Steamer *James Pickands* struck on reef at Eagle River during dense fog and became a total loss, September 22, 1894. No lives lost. Estimated loss on vessel and cargo, \$88,200.

No. 4. Two scows broke loose from tug *Howard* in heavy weather—one foundering; the other driven ashore—and became total losses. No lives lost. Estimated loss on vessels and cargoes, \$7,000.

No. 5. Steamer *Geo. L. Colwell* drove ashore at Deer Park during a heavy north gale, October 13, 1894. The crew was gallantly rescued by the life-saving crew. Estimated loss on vessel, \$9,000. Released.

No. 6. Schooner *D. P. Dobbins*, in tow of the steamer *Colwell*, drove ashore at Deer Park during heavy north gale, October 13, 1894. The crew was rescued by the members of life-saving station No. 12. Estimated loss on vessel and cargo, \$6,500. Released.

### SAULT STE. MARIE RIVER.

No. 1. Schooner *Akira Cobb* sank by collision in Mud Lake August 24, 1894, during dense fog. Estimated loss on vessel and cargo, \$8,000. Raised.

No. 2. Tug *Crusader* caught fire during early morning of November 6, 1894, at Sault Ste. Marie and became a total loss. Two lives were lost. Estimated loss on vessel, \$12,000.

### LAKE MICHIGAN.

No. 1. Schooner *Louisa A. Glade* sprung a leak during a heavy gale and cloudy weather and stranded near Manitowoc, March 5, 1894. One life was lost. Estimated loss on vessel and cargo, \$1,400.

No. 2. Steamer *Minneapolis*, bound from Chicago to Buffalo with the schooners *San Diego* and *Red Wing* in tow, encountered heavy weather, and when off McGulpin Point in a field of ice, foundered in 20 fathoms of water, and became a total loss, April 4, 1894. The crew was rescued by the schooner *San Diego*. Estimated loss on vessel and cargo, \$80,637.

No. 3. Schooner *Island City* sprung a leak during heavy northwest gale, and being overborne by heavy seas and stress of weather, became a total loss, April 8, 1894. The captain was washed overboard by the heavy sea with the yawl, which he managed to get into, and floated ashore north of Milwaukee in an exhausted condition. The other 2 men of the crew went down with the vessel. The vessel was supposed to have foundered 14 miles from Milwaukee. Estimated loss on vessel and cargo, \$1,220.

No. 4. Schooner *Lottie Cooper*, loaded with lumber, foundered at her anchors in a heavy gale and became a total loss, April 12, 1894. Before the Sheboygan life-saving crew could reach the vessel, 1 sailor was washed overboard and was drowned. The captain and 3 of the crew were rescued with great difficulty. Estimated loss on vessel and cargo, \$8,350.

No. 5. Schooner *John V. Jones* collided during foggy weather 11 miles northeast of South Manitou Island, April 28, 1894. Estimated damage to vessel, \$600.

No. 6. Schooner *M. J. Cummings*, in a heavy northeast gale, broached to and, casting anchors, paid out the chain to steady her, but struck bottom and was scuttled, sank, and became a total loss, May 18, 1894. The crew of 7 persons took to the rigging, 2 of whom perished from cold; the other 4 were washed from the rigging and drowned; 1 survivor, after heroic efforts, was saved. Estimated loss on vessel and cargo, \$6,000.

No. 7. Schooner *C. C. Barnes* stranded in Milwaukee Bay during heavy northeast gales, May 18, 1894. No lives lost. Estimated damage, nominal.

No. 8. Schooner *Evening Star* foundered off Twenty-sixth street, Chicago, Ill., during the heavy gale of May 18, 1894, and became a total loss. No lives lost. Estimated loss on vessel and cargo, \$2,500.

No. 9. Schooner *C. G. Mixer* stranded during heavy northeast gale off One hundredth street, Chicago, Ill., May 18, 1894, and became a total loss. No lives lost. Estimated loss on vessel and cargo, \$7,500.

No. 10. Schooner *J. L. McLaren* stranded off Twenty-seventh street, Chicago, Ill., May 18, 1894, during heavy northeast gale. One life lost. Estimated loss on vessel and cargo, \$14,000.

No. 11. Schooner *Jack Thompson* stranded off Twenty-seventh street, Chicago, Ill., May 18, 1894, and became a total loss. One life lost. Estimated loss on vessel and cargo, \$5,500.

No. 12. Schooner *Myrtle* foundered in Chicago harbor during heavy northeast gale, May 18, 1894, and became a total loss. This vessel came in during the afternoon in a water-logged condition and attempted to anchor, but collided with the schooner *Evening Star*, then drifted away and struck the schooner *Clifford*, stove in her bow, and began to sink rapidly. She then drifted out and foundered. Six lives, her entire crew, were lost. Estimated loss on vessel and cargo, \$2,250.

No. 13. Schooner *H. B. Moore* stranded during heavy northeast gale 26 miles southeast of Chicago, Ill., May 18, 1894, and reported a total loss. No lives lost. Estimated loss on vessel and cargo, \$2,500. May be released.

No. 14. Schooner *Lincoln Doll* was beached during a heavy northeast gale May 18, 1894, and became a total loss. One life lost. The remainder of the crew were rescued with great difficulty by the Evanston life-saving crew. Lost off Glencoe, Ill. Estimated loss on vessel and cargo, \$5,000.



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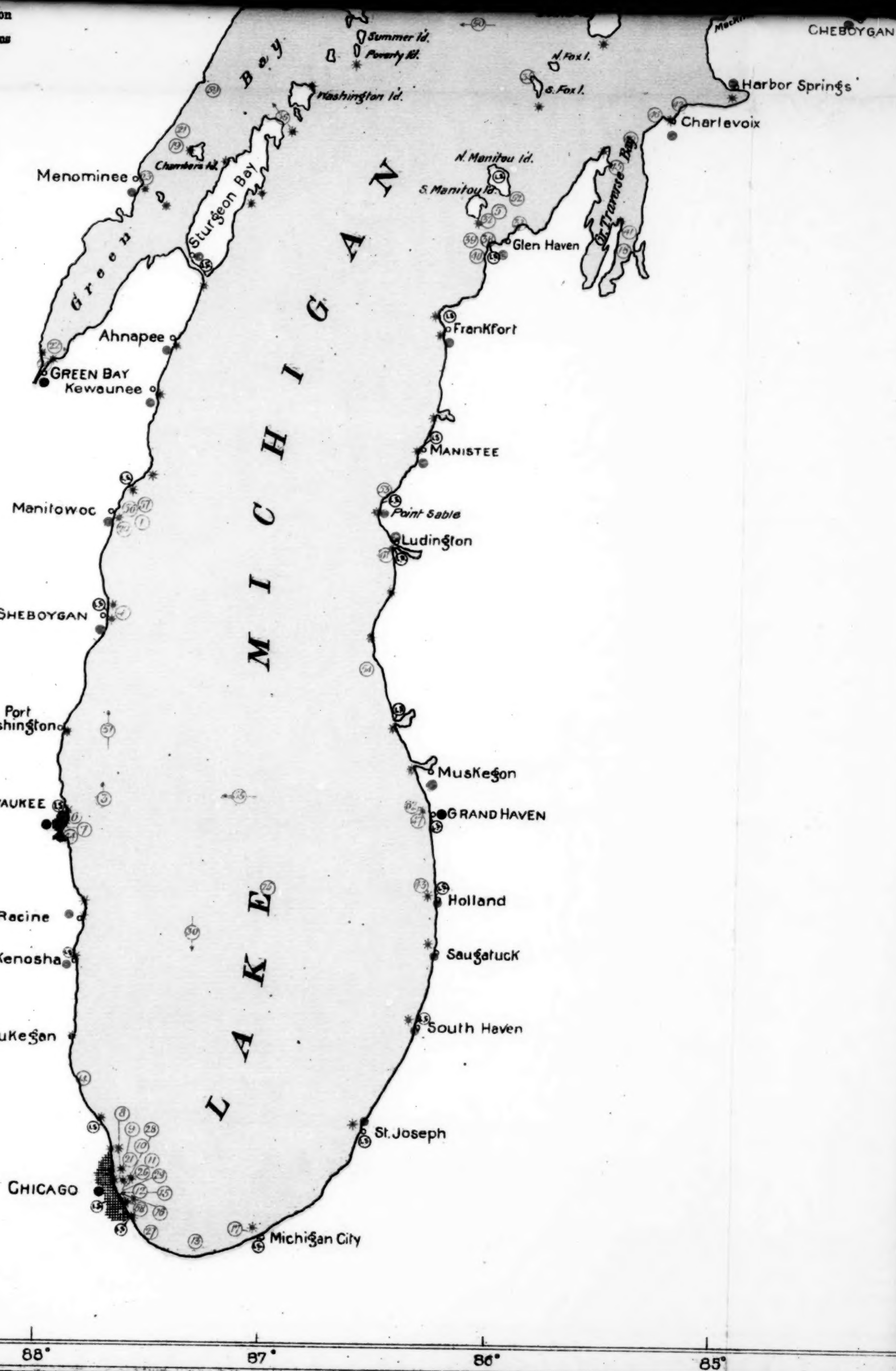
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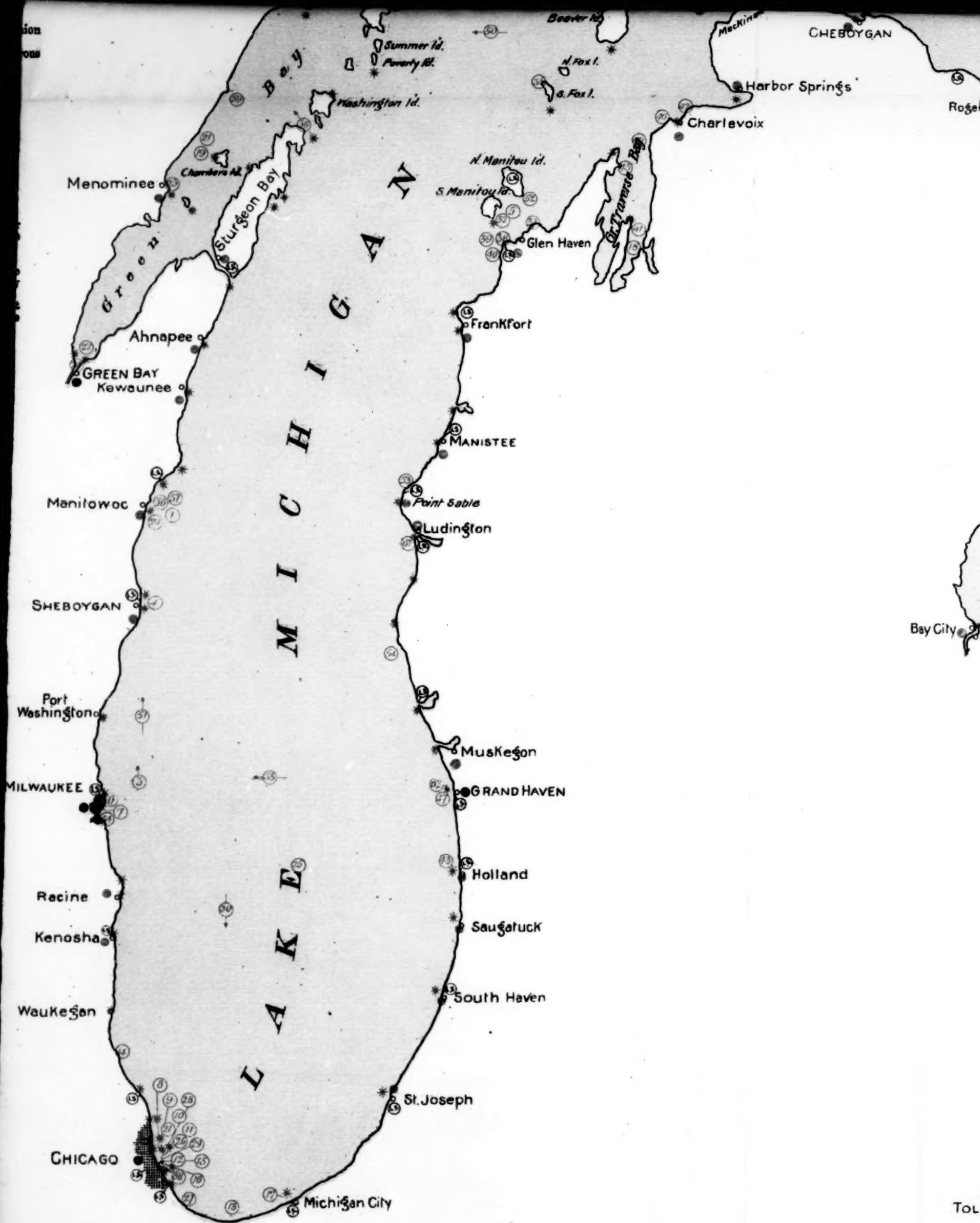
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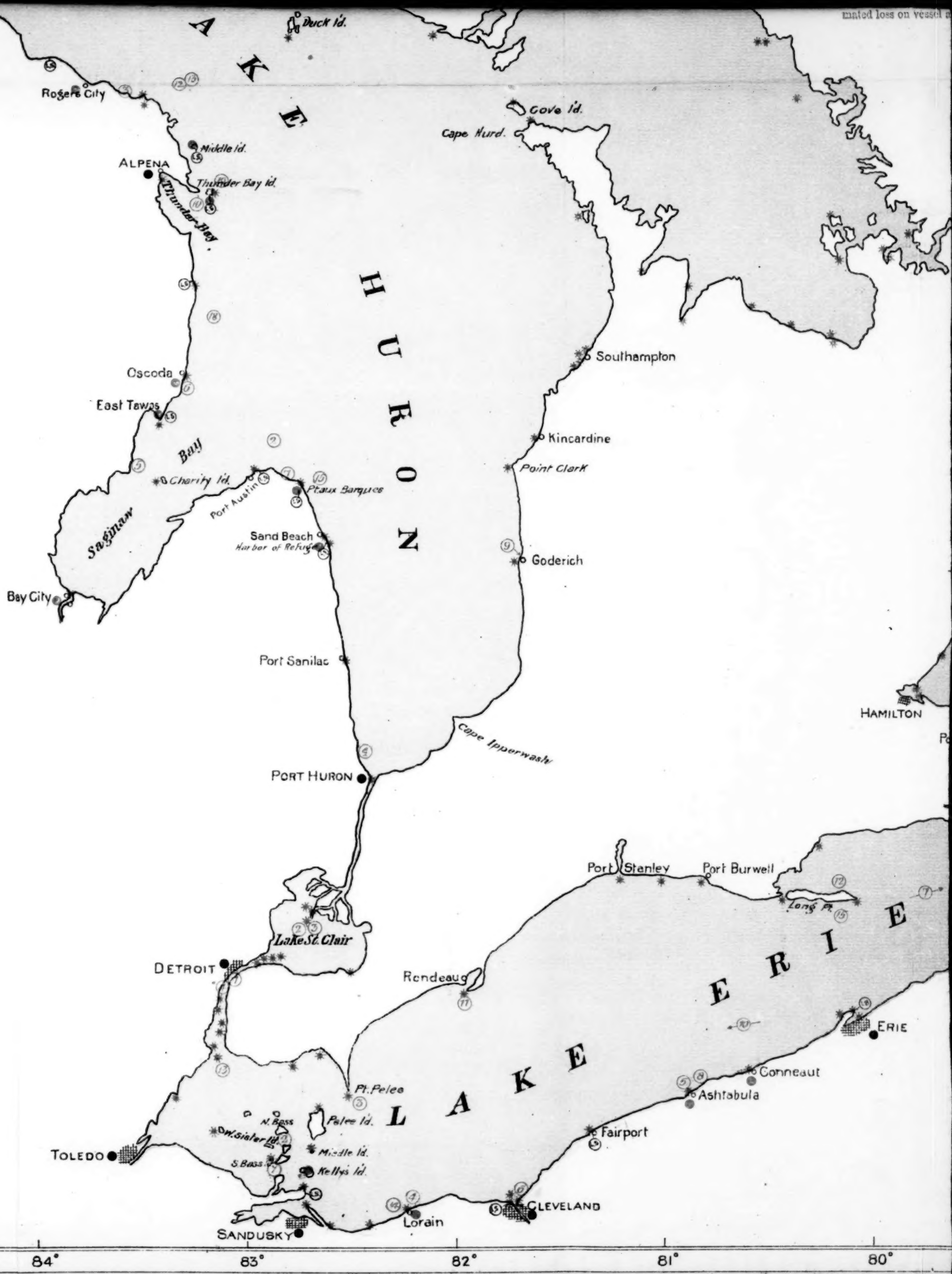
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ted loss on vessel and cargo, \$18,510.

even they were nearly huddled, as they dare not leave the pumps long enough to procure food, and were covered with frozen spray. The schooner was finally rescued by the fishing tug *Susie Bard* and taken to Lorain, Ohio. No lives lost. Damage to vessel, \$—.

No. 15. Steamer *Colgate Hoyt*, bound from Duluth to Buffalo with a cargo of wheat, pulled under Long Point during a heavy northwest gale and snow squall and grounded, November 25, 1894. Before being released, cargo to the amount of \$5,000 was jettisoned. Damage to vessel nominal.

#### LAKE ONTARIO.

No. 1. Schooner *Glad Tidings* ran ashore on Bakers Point, May 10, 1894. No lives lost. Estimated loss on vessel, \$500.

No. 2. Schooner *Hartford* foundered in Mexico Bay during high northwest gale, October 11, 1894, and became a total loss. Seven lives were lost. The captain, wife, and baby, and 4 of the crew were supposed to have gone down with the vessel. Estimated loss on vessel and cargo, \$18,000.

No. 3. Schooner *Baltic* foundered during high westerly gales and became a total loss near Oswego, N. Y., November 24, 1894. No lives lost. Estimated loss on vessel and cargo, \$9,300.

No. 4. Schooner *D. G. Fort* was driven ashore near Oswego, N. Y., during a heavy northwest gale, and after the seas went down the vessel was stripped and abandoned as a total loss. No lives lost. Estimated loss on vessel and cargo, \$4,000. —This occurred on November 27, 1894.

